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11353-A
TECHNOCRACY
INC.

16 Mar 87

Greetings Ed:

I hope the attached comments are of some help and not too far off the mark of what you wanted. In a situation such as this I am glad that you are the Editor and not ~~me.~~ I, Good intentions and sincere efforts by some contributors are hard to handle, I'm sure. You are to be admired for your dedication and your dontribution, at age 76! I'm a mere 74.

Thanks for your note. In respect to the mailings I occasionally put out, I dont expect answers or comments necessarily, unless someone feels the urge to continue a dialogue. I usually send out about 10 copies and seldom get any feedback. In many ways I am gradually disengaging, and doubt if I will have much to say in future. But I plan to continue my membership, maintain contacts, and keep a watch on the times. I want to see how all this turns out! We just had our 40th wedding anniversary and are aiming at our 50th and the year 2000 AD!

Regards, Walt Fryers.

Address: 11353 A, Technocracy Inc., ~~9203, S 112th St.~~, Edmonton, Alta. ~~T6G 2G5~~

No statement of policy shall be binding upon the organization unless issued from Continental Headquarters of Technocracy Inc.

Confidential.

COMMENTS ON THE PAPER BY W. H. ORSER: "STARVING IN THE GREENHOUSE".
(Requested by E. R. McBurnie, Feb. 26/87)

I hardly know where to start. The paper is not of acceptable quality as Technocracy literature. I dont consider it suitable for magazine material.

The author is quite widely read, it appears, but not deeply. The result is something of a compendium of current and trendy 'phobias'. It is overwhelmingly negative - a fault I find with much of Technocracy's recent output. For most of the problems noted in the paper there is intensive research in progress, and remedial action is in hand or in prospect. It is time that we recognized the positive aspects of the current scene - the great steps being taken, even under a Price System, to face the problems in a constructive way.

It is time, I think, that we conceded that Technocracy cannot criticize the Price System to death. Scott visualized the change from a Price System to a Technate as one of physical evolution and pure necessity; at the same time illustrating the faults of the one and the benefits of the other. Reading the tirades of criticism in this paper and other such sources, one would infer there is no constructive adaptation within the present structure. On the contrary, there has never been, perhaps, such a rapid development of science and technology and its applications as in recent years. The elements of a Technocracy are being rapidly put in place.

To be more specific, the paper should be treated more as a letter to the Editor, signed, than a contribution to Technocratic literature.

In para.1 we read: "then cooperate with the rest of mankind to manage the earth's resources intelligently". Does he imply that non-American authorities would participate in control of our resources; or we, theirs? Does he think there is some 'equitable' division of resources possible on a world scale? The world is not ready for the 'world view' yet, by a long way! The various economic regions of the world are interactive to a degree, yes, but still separate and distinct and unequal. Our concern must be with North America.

About the ozone layer and the threat of ultra-violet radiation: This morning's Globe and Mail (10 Mar 87) has a front page article: "Skin cancer rising rapidly, scientists say". Further on in the article it reads: "Other witnesses said that, while there still is scientific uncertainty, it appears the ozone layer is being destroyed by chemicals such as chlorofluorocarbons". (Emphasis mine). This whole subject is a leading edge of one facet of scientific investigation in the meteorological field. It is quite a testimonial to the capability of science under extising conditions, to determine and act upon such problems. One of the leading scientists in the world working on this problem is Dr. Alex Chisholm, who was once a member of my staff at CFB Cold Lake. I read that he favors more research, plus corrective action, world-wide. Yes, the problem is being defined and faced! Now!

Mercury in the environment was a popular phobia a while back. It is not so prominent now. The metal 'lead' is another hazard. Such as these are being discovered and countered by present day means. One of the marvels of modern science is the technique designated 'NMR' - Nuclear Magnetic Resonance. Substances can be traced and identified, almost moleculr by molecule. That is a positive aspect. Technocracy should emphasize such advances. But some of our writers jump on the bandwaggon of popular concerns and try to make time with the new findings in a negative way.

This paper is overwhelmingly of the 'gloom and doom' type, and tries to establish that Technocracy is the only option to the problems mentioned. This doesn't 'compute' ! Much of the reasoning is of the 'extrapolitis simplex' type, to use a phrase that I coined a while ago. Take a trend - any trend, populations growth, CO_2 in the atmosphere, resource consumption, inflation, scarcities - and extend it unconditionally into the future, and you can envision catastrophe. Sunday supplement writers love these subjects. They would have helicopters flying around thick as mosquitoes; populations migrating to outer space; cities under water; worlds in collision; whatever. Fear sells. Sensation sells. Sex sells. But Technocracy doesn't have to depend on such techniques, in my opinion.

There are lots of errors in Orser's paper. In para. 5 he links ultraviolet rays and the melting of the ice caps. Wrong. He suggests that the greenhouse effect could be as lethal as a nuclear plant failure. How lethal is that? He says further: "the greenhouse effect, like a cancer, is slow and insidious, but for millions, ultimately fatal." Can he be so sure? Climatic change is going on all the time, and so are adaptations to it. So far the effect is speculative, at least in degree. Science is working on defining the problem and on the nature of the solution. But the writer cant wait, it seems. In truth, some areas could benefit by some warming. But the writer can see only "famine on a scale so far unprecedented". What are we peddling? Fear and ignorance? Or hope and understanding?

In para. 13 the writer speaks of "any technology, whether it be mechanical, electrical or agricultural". There are many other technologies. Why mention these three? 'Agricultural technology' doesn't fit with the other two basic classifications. 'Chemical' would be a better fit. Perhaps he could say: "...mechancial, electrical, chemical or any other". Or "...mechanical, electrical, chemical or any of the myriad combinations of these". But that would still omit such as nuclear, biogenetics, various information and computer technologies, and so on.

Why go on? The point I am making is a criticism of not just one writer and one article, but of the whole intellectual environment of Technocracy in recent history. When Scott was alive, Technocracy had some creditability for understanding and interpreting science and technology, as well as the contemporary social environment in which these forces were taking effect. But since then Technocracy Inc. has become so negative and myopic that little creditability remains. And that is too bad !

15 Mar 87 Walt Fryers.

feb. 26,1987

Dear Walt:

Thank you for all of your correspondence and clips over the past years. I can never find the time to answer them properly, as I am loaded with work at all times, and I am getting older and slower.

Also as you know you are not always found in favor with CHQ and everything for the mag goes through there.I am supposed to send copies of my letters to CHQ but seldom do, chiefly because of lack of time. That's why I am writing unofficially to you, which I am not supposed to do either.

I didn't go for your letter re immigration for the same reason. I agree, but it is almost impossible to talk to anyone about sensible things yet, and I didn't think it would be pursued by the public. I was wrong on that count. There must have been a great reACTION -capital not intended - to the last great influx of immigrants to make the government move as it did.

I want to get out of the rat race too. Had a heart attack last October and still not right. At 76 I have not got the capacity to remember, and spend much valuable time retracing my steps to locate material. Every time I say I want to quit there is a howl from the members, and I hate to leave the work piled on others.

If I do not hear from you within my alotted time I will phone you at 9.00 am to hear your criticism.

Meantime this is a private conversation. Regards to yourself and your wife., ed

E. R. McBurnie
528 E. 10th Street
NORTH VANCOUVER, B.C.
V7L 2E6

Feb. 26/87

Mr. W.R. Fryers
11515 - 39 Ave.
Edmonton, Alberta
T6J 0M5

Dear Walt:

Sending you a contribution from Bill Orser in Oliver, B.C. hoping you can check it over for publication.

I am not up on all these things and do not have time to dig deeper. I have to depend on others.

Time is OK for a couple of weeks. If I get desperate I will phone you. Trust you and Mrs. Fryers are holding your own in the war against age.

Thanks, Ed

ed

Ed~~ito~~r

STARVING IN THE GREENHOUSE

1. North America produces more extraneous energy than any other like area in the world. With the resources it still possesses and its advanced technology, it can either destroy the world, or lead the way to peaceful and healthy existence for mankind. To do this, we must first clean up our own yard and then cooperate with the rest of mankind to manage the earth's resources intelligently.

2. Environmental scientists are warning us about our environment, stating simply it is imperative that we change our methods of management, that unless we reduce our growing use of coal and Hydrocarbons as well as chlorofluoro carbons, our newest threat, known as the greenhouse effect, will become lethal to millions of people. Chloroflouro carbons are, among others, used in car air conditioners, and home and industrial refrigerators.

3. The human effects on atmospheric composition through the size and operations of the terrestrial eco system can overwhelm the life support systems created in nature over millions of years. This so-called greenhouse effect could be as lethal as a nuclear plant failure, or environmental pollution on all out nuclear war. Where an all out nuclear war could exterminate a large portion of the five billion earthlings hours after it broke out, the greenhouse effect, like a cancer, is slow and insidious; but for millions, ultimately fatal.

4. The greenhouse effect means ~~that~~ the gases we create - mainly carbon dioxide - accumulate in our atmosphere, which prevents the radiant heat from the sun at the earth's surface from escaping back into space. BLURB

5. Environmental scientists are also warning us about growth of ultraviolet rays in the atmosphere, and melting of small amounts of the massive expanse of polar ice. Results could trigger an increase of world temperatures of three to eight degrees, which would raise the ocean levels as much as six feet, which would in turn, drown most of the world's port cities permanently. These higher temperatures

in areas that are primarily agricultural, would wipe out huge areas of the world's food producing regions, and could, in turn, create famine on a scale so far unprecedented.

Threats to man's survival such as the greenhouse effect, along
with a colossal potable water problem,excesss population, pollution
and resultant crime are possible. The depletion and waste of the
6. forests that contribute greatly to life's sustenance by converting
carbon dioxide to oxygen, and the constant threat of nuclear war,
continually haunt us. These concerns are too big and complicated to
be understoodby those of us who are only concerned with watching
television and getting our hands on dollars.

People everywhere are pretty much the same; but we here in
North America are the humans who have been placed in a most unique
position. We hold the key to resolving such problems, but we have
7. not yet used it because we have not realized where we are in our
scientific journey.

As ordinar~~l~~y people, we use our refrigerators and cars, and
have grown accustomed to the use of a tremendous complex of technology
without realizing that our technology carries with it an obligation
to control it for the welfare of ourselves and others, including
coming generations. Each of us has a share of responsibility in how
8. our technology is used. So far, we have permitted technology to be
used on a promiscuous basis to gain profit in money. Obviously, man,
with his misuse of technology has become a monster of waste and a
threat to his own life.

Lead and teach bf

Technocracy's social design shows us how technologistscan
reorganize the distribution system of this North American continent
9 into a new configuration - one that is designed to be compatible
with ~~the~~ ecology for the benefit of people directly - one which
will eliminate the mindless chaos and waste that now prevails.

North America exerts a tremendous influence on other peoples.
10 We can turn what has become a tremendous juggernaut into a model

of social management for the rest of the world to emulate. We have everything we need to work with. The action that is needed is the will of the individual to trust him/herself, To ~~investgiate~~ investigate the facts and then turn the key to a Technate.

Do not expect the spokesmen for the status-quo, the protagonists of the Price System to look for the key that will resolve North America's social problems.They have what they want -the power to misuse technology for profit - or the urge to achieve that power.
11, They attempt to control a mechanism they do not understand; indeed they do not seem to understand the physi~~s~~cal laws upon which technology is based. They are working with a mentality of the past. It is a mentality completely out of focus with the requirements of technology. Proof of this is the millions in want in the richest land area on earth.

There are many threats to our survival on this planet. All of them are man-made. Among them are nuclear accidents, nuclear war, politics, social chaos and greenhouse effect. The solution is not
12, in putting new faces in government to do the same old things. It is recognition of technology's place in governance. Government by skill instead of government in search of profit.

Must control technology bf

Remember when you first tried to ride a bicycle, and how you had to understand the problems before you could ride safely? It is
13 the same with any technology, whether it be mechanical, electrical or agricultural.One must know the causes to arrive at a solution.

It is the same in Technocracy. Scientists first researched all of the problems and resources, then laid out the concept for a social system which is compatible with technology. Once all of the
14 social problems in North America are thoroughly understood, the Technocratic concept will not ~~olny~~ only be deemed desirable; it will become abundandly clear that it is absolutely necessary for our survival.

W.H. Orser

"Aide Memoire"

1. To renew a membership, send $9.00 (US) to:
   (For Members-at-Large)

   Continental Headquarters,
   Technocracy Inc.,
   Savannah, Ohio. 44874

2. To subscribe to the magazines, send $10.00 (Can.) to:
   (Includes 4 issues of the Digest,)
   (and 4 issues Northwest Technocrat.)
   (Both are quarterlies.)

   Technocracy Digest,
   3642 Kingsway,
   Vancouver, B.C. V5R 5M2

3. To subscribe to Vancouver's Section bulletin, send $5.00 (Can.) to:
   (For organizational news for a)
   (large section of the continent)
   (centered on Vancouver.)

   Section Activities Calendar,
   12349-1 Technocracy Inc.,
   3642 Kingsway,
   Vancouver, B.C. V5R 5M2

4. To give a donation or pledges to the Edmonton function, send cheque(s) to:

   Walt Fryers,
   11515 39 Ave.,
   Edmonton, Alta. T6J 0M5

   or

   John Gregory,
   6511 124 St.,
   Edmonton, Alta. T6H 3V4.

   Make cheques payable to: "Technocracy Trust Account, Edmonton."
   Some members have found it convenient to provide post-dated cheques for several months at a time, usually for $10.00 per month.

8 Dec 86

wf

11515 39 Ave.,
Edmonton, Alta.
T6J 0M5

8 Dec 86

To: Members of Technocracy Inc. in the Edmonton Area.

1. In our communication of 8 Nov 86 former members of Unit A, R.D. 11353 of Technocracy Inc. were advised that a wind-up meeting would be held on 14 Nov 86, 7:30 pm, in the "Quiet Room" of the Strathcona Branch of the Canadian Legion.

2. The meeting was held as planned, with five members present. All three of the former executive of Unit A were present: Organizer Howard Rennick; Secretary John Gregory; and Treasurer Walt Fryers. Members Jack Miles and John Wilson also attended.

3. It was agreed that the remaining funds in the Current Account ($249.59) would be "written off" as storage charges, but retained for local contingencies in a special Savings (Trust) Account. This has been done, as of 3rd Dec 86. The "trustees" are: Walt Fryers and John Gregory.

4. It was further agreed that donations and monthly pledges would continue to be received from interested parties, and deposited for future use toward the survival and promotion of Technocracy in Alberta, if and when opportunities arise. Such action could take many forms, without the requirement of a formal organization here: a speaker could be imported; a bursary could be established; a telephone listing a window display; a literature distribution by bulk mail methods; a booth at suitable public events; periodic bulletins and mailings to members; etc. etc. Whatever the activity might be, it would depend on volunteers coming forward to carry it out.

5. There is still a core of Members-at-Large in this area. This informal group will survive and maintain contact as long as the present situation continues. It is anticipated that there will be informal get-togethers of known members and contacts. In such a case the word will be passed around to anyone interested. So keep in touch. New contacts and sign-ups are welcome.

6. Finally, we are all MAL's now. That means you must renew your membership for 1987 directly with CHQ. The fee is $9.00 (US). Very reasonable, wouldn't you say? Address your remittance to:

Continental Headquarters,
Technocracy Inc.,
Savannah, Ohio. 44874

And while your at it, consider a subscription to the magazines: 4 issues of Technocracy Digest and 4 issues of the Northwest Technocrat; both are quarterlies. Ten dollars Canadian gets them both, via the Digest.

As cartoonist Bairnsfather's character 'Old Bill' used to say to his trench buddies in World War I: "If you knows of a better hole, go to it!"

Walt Fryers
Walt Fryers

11515 39 Ave.,
Edmonton, Alta.
T6J 0M5 ph. 434 4496

8 Nov 86

To: Members of 11353-A, Technocracy Inc.

Subject: Wind-up of Unit A, R.D. 11353, Technocracy Inc.

1. The resignation of Walt Fryers as Treasurer of 11353-A on 29th March 1986 was accepted by CHQ's letter of 7 April, 1986.

2. Efforts by CHQ to replace the Treasurer through contacts with the Organizer, Howard Rennick, were unsuccessful.

3. The balance of the Unit executive - Organizer Howard Rennick and Secretary John Gregory - also resigned.

4. It became necessary then for CHQ to terminate the Unit and reassign all members to Member-at-Large status.

5. The affairs of the Unit have not yet been wound up. There is a small bank balance. There is some furniture and equipment. There is a considerable supply of literature. There is no official mailing address, although mail still comes in. And so on.

6. Some members would favor continuing as an informal group, having no formal structure or location, but meeting occasionally to keep in touch. And then there is always the possibility that someone will appear to take up the 'torch' and begin the organizing task again, taking over the residual records of former Unit A.

7. To give the surviving members of 11353-A a chance to participate in the wind-up process, a meeting of members has been agreed upon by the former executive. It will be in the 'Quiet Room' of the Strathcona Branch of the Royal Canadian Legion, 10416 81 Ave., (ph.433-1908) at 7:30 pm., Friday, 14 Nov 86. Try to be there.

8. If you attend, identify yourself as attending the Technocracy group meeting in the Quiet Room. It is in the basement. Turn right and right again at the bottom of the stairs, then straight ahead to the end room.

For the Edmonton group,
Walt Fryers.
Walt Fryers (ex-Treasurer).

cc to Bonnie Gebhardt, Calgary, Alta. (You planned to attend?)

DRAFT

Date:

To:

Subject: Canada's Immigration Policy.

1. It is my considered opinion that Canada's 'door' to immigration should be narrower, not wider. In my view it would be a political and economic mistake of the first magnitude to open the door to massive immigration, as recently proposed by government spokesmen.

2. The short-term economic stimulus that new arrivals are said to produce does not justify a policy of more immigration.

3. We are all from immigrant stock. The low birth rate now evident is by the decision of immigrants already here. It is the common man's way to achieve an equilibrium population suitable for this country at this time.

4. Canada is a mature country. It is no longer a colony nor a Less Developed Country. It does not have the obligations of empire, never having aspired to dominance over other peoples. Our destiny is ours to determine.

5. A policy of more immigration at this stage implies an attitude on the part of our government that the present population cannot procreate itself, or, in response to economic circumstances, will not. Who, indeed, would have the temerity to overrule the self-imposed equilibrium chosen by Canada's citizenship. As they say, you can fool some of the people some of the time, but not all of the people all of the time. There will be an accounting.

6. The manoeuvre of masking immigration in the name of helping refugees would be to perpetrate a fraud on the Canadian people in the name of charity and of humanitarianism. For every refugee who makes his way to Canada, there are hundreds and thousands, and even hundreds of thousands, more who would follow. In effect Canada is asked to solve another country's political problems, to the benefit of that country's status quo. Canada's government can then assume a humanitarian posture in order to pick up the political benefits believed to stem from the immigration involved.

7. It would appear that immigration is the last refuge of these political opportunists who are unable to solve this country's problems in any other way.

____

Name

____

____

Note: Is it not time to take a stand?

22/10/86

C H Q
TECHNOCRACY
INC.

TO: Walter Fryers, MAL
11515 39 Ave.
Edmonton, Alta. T6J 0M5

November 1, 1986

SUBJECT: "Canada's Immigration Policy"

1. CHQ has read your proposal regarding Canada's immigration problems. You ask for a comment. Inasmuch as the said policy is tangled up in all manner of political schemes we feel that it is nothing in which Technocracy would become involved.

2. If you, as a private Canadian citizen, wish to embark on a personal crusade against the mindless immigration of other peoples into Canada, that, of course, is your privilege.

CHQ
Technocracy Inc.

ADDRESS: CONTINENTAL HEADQUARTERS, TECHNOCRACY INC., SAVANNAH, OHIO 44874

John A. Taube (415) 334-3733
55 Chumasero Drive #7E
San Francisco, California 94132
November 1, 1986

Hi, Walt:

The more I read your material the more I realize that you are by far the most intelligent person in Technocracy. Flattery is not my strong point. Objective observation is.

Here is the way I see it. You maintain that the basis upon which Technocracy was built is intact. CHQ, on the other hand, finds that physical conditions have changed and the basis upon which Technocracy was built must change. But if CHQ position is correct, Technocracy has no reason to exist. Technocracy and scarcity are incompatible. The term "relative abundance" is a misnomer.

My position was made quite clear in the recent letter I sent to CHQ and I sent you a copy of it. I spelt out that in a Technate where the usual methods of business are removed, the use of energy and resources would be so greatly reduced that the needs for them would automatically be lessened without the quality of life suffering.

Well, we could go on and on to show the absurdity of CHQ's position but enough said.

Commenting on your "Canada's Immigration Policy." You contend that the "common man" has judged that a lower rate of population growth is advisable. I give the common man no credit of ever doing anything of any worth. During World War II, the common man could have introduced a Technate. But he elected to wallow in the slop of the profits of war instead. I suggest that you change #3 to go something like this after your first line: We the sons and daughters of immigrants, as a result of living affluent, our birth rate has gone down. This is fortunate. (new paragraph between 3 and 4). Every land area has a finite amount of resources; Canada is no exception. We are indeed fortunate that their is an equilibrium between our birth rate and our resources.

More comments. I suggest you take out "To" and "Subject." I suggest you have:

A STATEMENT OF POLICY!

CANADA'S IMMIGRATION POLICY.

Let me hear from you soon.

Cheers,

J.

John A. Taube (415) 334-3733
55 Chumasero Drive #7E
San Francisco, California 94132

Oct. 15, 1986
Recd 21 Oct 86

Hi, Walt:

Thanks for sharing your correspondence with CHQ with me.

Join the club -- to my knowledge you make the third person that has been "invited" to resign from Technocracy Inc. I have misplaced the letter from CHQ in which they invite me to "resign." Beside us, there was another member in Lemon Grove, California who unfortunately has died. How many others, I don't know. Such tactics makes an organization suspect.

I have lost all confidence in Technocracy Inc. and CHQ. I also have lost all confidence in the Section of which I am a member but that will be the subject of another letter.

Why do I stay in Technocracy? Only one reason: it recognizes that on North America the "change in the time rate of doing work" has smashed the Price System and the Price System must be replaced by a socio/economic system that is compatible with the technological day in which we live.

As long as Scott was the Captain of the Ship, the ship steered a straight course and the organization had a handle on events. The present staff at CHQ has no idea of the correct strategy to pursuit. Things are a mess. Under the present leadership (?) at CHQ, we have embraced some kind of socialism. Maybe communism! Note some of the articles in our magazines --if an article would fit comfortable in a socialist magazine, then it is out of place in our publications. Many of the articles in our magazines would fit comfortably in all socialists/communists publications. While this is so in the magazines, it especially so in the newsletter that come out of Portland. Note how they complain about everything; they seem to have forgotten that the chiseler always trims the sucker. The general tone of these articles is that there "bad guys" who are responsible for all are troubles

Furthermore, Technocracy is now some kind of a compromise between science and anti-science with a definite leaning to the anti-science. Its attitude on nuclear power shows that it has lost faith in our scientists. These scientists cannot solve the problem of disposal of the by-product of nuclear power? Nonsense!

My position is that the environmental movement is a movement back to a pre-technological age. Back to a hand-tool, stoop labor society. I feel that many of our members unknowningly are pushing for this very society and CHQ is part of the pack.

Note the position of CHQ in the enclosed June 6 letter. I have sent you a copy of a letter I got from Butler D. Shaffer. This was a reply to a letter that I had sent him. I sent a copy of Shaffer's reply to CHQ and asked them if them wished to correspond with Shaffer. They did and the Post Script was addressed to me. A bit unusual but that's CHQ! I have misplaced both CHQ letter and the Post Script. Enclosed is my reply to CHQ.

The Williams Adams letter was sent to me and I was requested to keep it confidential. Please see that nobody is shown it. As a matter of fact it is better than nobody see this letter and its contents unless you feel you have a person that you can trust. I am going to send a copy to Jim Davidson and I am sure he will hold the confidentiality that I request of this matter.

I would like to hear from both you and Jim.

Cheers,

John

John A. Taube (415) 334-3733
55 Chumasero Drive #7E
San Francisco, California 94132
August 23, 1986

John Spitler, Continental Director
TECHNOCRACY INCORPORATED
Savannah, Ohio 44874

Subject: your postscript of July 16, 1986

The postscript of which I am referring was attached to the July 16 letter to Shaffer. First my thanks for corresponding with him. I feel that there are some points in your postscript that call for clarification.

Technocracy's position on nuclear energy. The original Continental Hydrology stated that the back up to it was nuclear energy. It is quite obvious that our organization recognized that nuclear power from fission was a great and necessary source of energy. I received a letter from CHQ under the signature of John Sheldon sometime ago. It has been misplaced but the letter was definite in stating that CHQ had made an adjustment in its stand and had taken the position that at the present time nuclear power from fission is unacceptable as the disposal of the by-product of nuclear reaction was not adequate. I concluded, therefore, that CHQ had not altered its position in that it still found nuclear power from fission reliable but its position now included the caveat of a proper by-product disposal.

Our great scientists have brought us out of the Dark Ages of the agrarian life style to our marvelous modern technological age. This grand accomplishment can be credited only to them; it had no assistance from philosophers or the ecclesiastic. Business many times was an interference. There are some who feel that an adequate disposal of the by-product of nuclear fission reaction has: (1) been attained, (2) not been attained (3) as yet has not been attained, and furthermore, it will ever be attained even with our great scientists.

My interpretation of Technocracy's position on nuclear power was brought out in a recent letter that I sent to Ron Miller. A copy was sent to CHQ with Ron's name omitted and the name "Name withheld" used instead. In that letter I related how I answered a lady who asked me about Technocracy's stand on nuclear power. I stated that Technocracy found nothing objectionable about nuclear fission reaction and when the by-product problem is rectified, Technocracy will give it its full endorsement. I never doubted for one minute that my understanding of Technocracy's position on nuclear power was correct, and since I received no communication from CHQ to the contrary, I felt that CHQ had confirmed my conclusion.

After the Miller letter, I sent a copy of a letter that I had received from Walt Fryer, 11353-A, along with an article on nuclear power to CHQ. Both the Fryer letter and the article took a positive attitude to nuclear power by fission. Receiving no reply from CHQ, my confidence in my conclusion on CHQ's stand on nuclear power was reinforced.

You mentioned M.King Hubbert in your letter to Shaffer and that brings to mind a statement that he made at a seminar at U.C., Davis, 1980, where Technocracy had its information booth. Hubbert had this to say and I paraphase him: if we depend on the biomass for energy to any great extent, we will not only devastate the U.S. but probably the entire planet. He went on to say that with the breeder reactor, another type of fission reaction, we can derive enough energy for thousands of years.

An additional statement on the breeder reactor may be of interest. Aubrey J. Wagner, retired Chairman of the Board, Tennessee Valley Administration stated in a paper published by the National Council for Environmental Balance: "It [the breeder reactor] can convert the tails, the part of the mined uranium that we now throw away, to fuel, extending the life of our uranium by some sixty times. This would give us enough uranium within our own borders to last a thousand years or more. In fact, in the 250,000 tons of tails that we now have on hand, there is the equivalent of more than all the U.S. coal reserves, or more that all the OPEC oil reserves."

If CHQ feels that I am not in compliance with any rule of the organization on this matter, a letter spelling out the non-compliance would be greatly appreciated.

Reviewing CHQ's position as to the need of petroleum from the Middle East in the Technate of North America. I am torn between the position of CHQ as stated in your postscript, plus your June 6 1986 letter to me and what I learned from Ray Segar. When I was living in Palm Springs, I would go to the Section in Colton and had many interesting and informative talks with Ray. Ray, a Continental board member, beside being very knowledgeable, has a keen ability to convey his information. While Ray talked about a variety of things, many of which I have forgotten, one is very clear, and it is -- with the installation of a Technate, only those people who are essentially needed will go to work. The rest will stay home. Elaborating on this point -- with a minimum of exceptions, everyone today has enough clothes, furniture, cars, etc. So a huge amount of people manufacturing, transporting, selling, etc. these items will be staying home. Of course, all those engaged in financial pursuits will also stay home. There are numerous others beyond the space of this letter who will do likewise.

Citing one interesting example of present employment: mail -- only 20% is private. So 80% mail employees can stay home and when the energy saving from the vehicles not in use is added to the reduction of the energy not used by the employees who are staying home, this would be a substantial saving. Items of this nature go on and on.

So I am torn between what Ray taught me and the present position of CHQ. I cannot see the Technate's need for oil from the Middle East. When the waste of our Price System is eliminated, and the back up energy sources are utilized, North America can go forward without an outside need. Your expanding on this matter will also be greatly appreciated.

Another matter. When I write that North America does not need oil from the Middle East, I have assumed North America properly organized. As to the Price System, we can go back to just a few years ago and see the results the partial oil embargo placed on the U.S. by the Middle East. The Price System of the United States' needs for Middle East oil is quite obvious. Perhaps you miss my point. In your letter to Shaffer, you state "as long as present controls exist." Perhaps we are not too far apart; perhaps not at all.

In your postscript you state that there is only one body that establishes policies and administrations and that is CHQ. It has been my endeavor throughout these many years to follow strictly our rules and regulations. I have not altered any of my procedures and feel lost as how at this present time anyone can now accuse me of any violation. I value my membership in our organization and would never do anything to put it in jeopardy.

To: J.T. Spitler
CHQ
Savannah, Ohio 44874

August 22, 1986

Subject : John Taube

John Taube has been visiting Sec.2 R.D. 11833 for some time.
He helps in numerous ways:
(1) by promoting participation by members in socials and functioning.
(2) by providing video tapes of interesting program
(3) by encouraging student speakers to prepare and give short talks at our membership meetings.
(4) by giving well prepared speeches.
(5) by telephoning members to encourage their participation
(6) by planning socials for the Saturday Class

Recently he talked with me about receiving criticism for writing to non-Technocrats who have been published in the Technocrat magazines. We concluded that this had caused a conflict and he will no longer write to non-Technocrats (authors who are published in Technocracy magazines.)

We, also, discussed two policy conflicts:
(1Middle East
(2) Nuclear energy
We agree that no policy conflist should exist.
In a recent letter to John Taube you essentially stated that we could not consider the North American continent to be entirely independent of the Middle East and its oil.

Many of us perceive this to be an about face on an earlier policy statement that was expressed in a magazine article wherein Technocracy's stance was that we had better not involve ourselves with military alliances with the likes of Saudi Arabia, et al - as had been urged by the Secretary of State at that time. Military Alliance or "protective" military involvement would have been perceived by us at that time as Price System manoeuverings dedicated to preserving our oil dependence and the military/ industrial alliance.

I would see your more recent statement to John Taube as a rationalization of that previous stance of non-involvement to a recognition that our dependence is a fact and that transition to a non-dependent status may take considerable time. It would appear that in recognition of this fact, you now perceive that military intervention may be deemed necessary(even by rational minds) to avoid CHAOS on the North American Continent should the flow of oil be cut prior to the time when our power generation systems would be ready for such a cessation.

Indeed your response to John was confusing to me considering the previous stand taken by the organization, and it might be well to clarify this point at this time, especially since we have recently seen a significant drop in (claimed) domestic production of oil and the fact that war in the Middle East seems as imminent as ever.

Are you stating that CHQ doesn't want to issue any statement that would deny possible military intervention being necessary, or to indicate that it could never be in the best interest of the United States to intervene militarily ?

Could these two policies be stated clearly in a general mailing or in Sec.2's newsletter ?

Respectfully yours,

William E. Adams

Director
Sec.2 R.D. 11833
Technocracy Inc.

C H Q
TECHNOCRACY
INC.

June 6, 1986

TO: 12237-1
San Francisco
Attn: John A Taube

SUBJECT: Reply

1. In reply to your letter of May 28, 1986, 'Do we have any literature that addresses terrorism or the Middle East?' CHQ does not have anything regarding the subject.

2. Item two, 'how the enclosed letter could have been improved.' With respect to the letter that you sent to the editor of the San Francisco Chronicle, in the letter, you indicate, 'Technocracy Incorporated, an educational research organization proposes that North America operate as a self contained-technological-functional-entity. So operated, we would have no interests in the Middle East or elsewhere. End of terrorism for North America.' This is not wholly correct. The big item in the Middle East, other than the conflict of religion between the fundamentalist groups, is the overriding physical factor that would involve the United States is petroleum. Recognize at the present time our oil producing states are in a state of economic depression due to the drop in oil prices. For example, the number of oil rigs in U.S. has diminished from more than 3 000 to less than 1 000. States such as Texas, Oklahoma, and California have felt the impact of the low priced oil. This is a double edged sword, and it is liable to affect the U.S. in more ways than one. Oil at ten to fifteen dollars per barrel indicates that many of the wells in the U.S. are low producing, high cost operations, and that with oil at ten to fifteen dollars per barrel, many of these operations will close down. This in the end will mean that we will become more dependent on oil from outside the U.S. When the embargo of 1973-74 hit, we were getting a very large percentage of our oil from the Middle East, principally Saudi Arabia. As a consequence of the induced oil shortage brought about by the blockade at that time, U.S. has established other sources than Saudi Arabia. The Middle East supplies only a small amount of the additional oil that U.S. uses in the U.S. over and above our domestic production. In the operation of a Technate, it appears that we would still be dependent upon other nationa for part of our oil supply. It is possible that with the conservation methods employed by the Technate that we could get by with the oil produced in the Technate area. But this would have to be determined at that time. However, if the rates of consumption are anything like they are at the present time, we would still be dependent upon oil from other nations of the world. And U.S. would naturally be interested in the Middle East because of the oil situation.

ADDRESS: CONTINENTAL HEADQUARTERS, TECHNOCRACY INC., SAVANNAH, OHIO 44874

3. I wish you had asked for comments on this letter before you sent it out. If you had submitted it for approval before sending it out, CHQ would have asked you to hold up on it, because of the many factors that are involved in the Middle East situation. Terrorism is one aspect, but we have to be more concerned about the resource situation. As far as the letter is concerned, comments for improving it, I think it would have to be attacked from an entirely different angle than you have done.

4. 'If the enclosed letter is printed and I receive requests for literature, what shall I send?' Again, it's a proposition of letting our stand be known, and a selection of our standard literature such as "Why Technocracy?" "Energy Accounting" etc., and if they are sufficiently interested, the TTSD.

5. Regarding the Video Cassette of the lecture you gave, we have not had time to review it, but will try to get to it in the near future.

John T Spitler

John T Spitler
Continental Director

CHQ
TECHNOCRACY
INC.

TO: Walt Fryers, MAL
11515 - 39 Ave.
Edmonton, Alta. T6J 0M5

October 15, 1986
Rec'd 21 Oct 86

SUBJECT: Corrections

1. Thank you very much for your kind efforts to correct mistakes in the Digest article which could only have been the result of trying to meet a deadline. The error is mine alone and will be corrected in a future issue of the Digest.

2. Would that you could be as successful in correcting the mistakes being made by the North American political leadership.

L. W. Nicholson
Technocracy Inc.

LWN/skb

ADDRESS: CONTINENTAL HEADQUARTERS, TECHNOCRACY INC., SAVANNAH, OHIO 44874

11515 39 Ave.,
Edmonton, Alta.
T6J 0M5

7 Oct 86

Continental Headquarters,
Technocracy Inc.,
Savannah, Ohio. 44874

Attention: L. W. Nicholson.

1. In a recent article by you in Technocracy Digest No. 280 you make the statement "we used 31 billion, 338 million horsepower of energy".

2. Any knowledgeable person reading this would conclude that:
   a. you and your collaborators do not understand the difference between 'power' and 'energy'; and further
   b. you have little regard for the definitions of the words you use.

3. Upon reflection you will no doubt realize that a machine can have a horsepower rating but, if idle, will not use any energy at all.

4. Your statement could be corrected by adding: '-consuming devices'.

5. Perhaps you can pass the blame on to your editor, proofreader, or typist.

6. But another example of your confusion occurs in a later paragraph, where an attempt is made to equate a power rating (30,000 megawatts) with finite quantities of energy (212 million barrels of oil, 47 million tons of coal).

7. Such gross errors in physical measurements are unworthy of an organization that purports to be scientifically oriented, or an official spokesman for it.

Walt Fryers.
Walt Fryers.

cc Editor, Technocracy Digest.

John A. Taube
(415) 334-3733
55 CHUMASERO DRIVE #7E
SAN FRANCISCO, CA 94132

October 15, 1986
Rcvd. 22 Oct 86.

Hi, Walt:

Right On! I was thrilled with your October 7 letter.

Keep up the good work!

Cheers

J.

(Re LW Nicholson's article in Tech Digest.)
W.A.

John A. Taube
(415) 334-3733
56 CHUMASERO DRIVE #7E
SAN FRANCISCO, CA 94132

PM
OCT
1996

USA 14

Walt Fingers
11515 39 Ave
Edmonton, Alta
T6J 0M5
Canada

© USPS 19

11515 39 Ave.,
Edmonton, Alta.
T6J 0M5

13 Oct 86

To: CHQ

Re: Copy of Howard Scott's letter of 22 Sep 62 to Lucille Reals. (Attached).

1. Sometime back (3 - 4 months?) I received a couple of items from CHQ, including the above referenced item, with no covering letter or explanatory note.

2. The second paragraph was overlined in color to accent that section. I concluded that the passage was drawn to my attention to explain and justify the contemporary policies of CHQ - i.e. that the Technocracy design be advocated for installation at any time and any place, even under conditions of scarcity, if some considerations of area & resources are met.

3. Conspicuously absent from the criteria mentioned by Scott in that second paragraph are any references to the population factor and to the co-related specification of the energy conversion (consumption) rate, per capita, (usually suggested as around 20,000 Kg.Cal./Cap/Day).

4. The relationship between population size and energy conversion rate per capita is intrinsic to the Technocratic design as I understand it. It constitutes the distinction between a scarcity economy (a Price System) and an economy of abundance (the Technocracy). Indeed, it was the work of Scott and associates who established this relationship in the first place. It is not amended, revised or contradicted by the subject letter.

5. It is, of course, possible to state theoretically, as here, that, when all pre-conditions are met, Technocracy's system of social operation could be applied to any major area of the earth's surface. That prospect provides hope and direction to all who take issue with Technocracy's North American orientation.

6. In practical terms (tactical terms) the prospect is most imminent here on the continent of North America. The critical rate of energy conversion appears to have been achieved here and now. It is even now driving this area into an economy of abundance - relentlessly.

Walt Fryers.
Walt Fryers.

P.S. In line 2 of para. 3 of Scott's letter the word intended is 'tenets', not 'tenants'. A typist's error?

From the Howard Scott file at CHQ

Miss Lucille Reals September 22, 1962
7337 S. Shore Drive, Apt. 1127
Chicago 49, Ill.

Dear Miss Reals:

We have received your letter of September 15 in which you comment on the literature that we sent you and in which you state that you find yourself in agreement with many of Technocracy's ideas, although later you seem to think that Technocracy's approach is limited and dehumanized, as you state, 'the limitation of your system to North America and the scientific, although vague, neatness of your plan, disturbs me.'

Technocracy Incorporated is a non-profit, non-sectarian, non-political membership organization incorporated under the laws of the state of New York. We have limited our organizational activities to the Continent' of North America, which is, of course, a tactical limitation under today's conditions. Technocracy, the body of thought, is in reality a technology of geomechanics, a scientific system for the control of all operations involving this earth. It is, therefore, applicable on every other continent of the globe and would achieve vastly different results from the present political, economic operation of any area, whether privately owned or state owned. However, it must be borne in mind that each continent has an entirely different setup and continental complex of arable land, fresh water, number of growing days in a year, and precipitation, along with a geological structure and conformation that would provide the natural resources and energy potential. It is, therefore, obvious that, while Technocracy's system of social operation can be applied to any major area of the earth's surface, the social resultants will be different due to the basic differences heretofore stated.

The philosophy of political socialism has as one of its fundamental tenants the expropriation of the owning or capitalist class and the operation of the socialized state for the common good of all. This, of course, would be accomplished through legislation by the new government of the people. It does not axiomatically follow that a change of ownership would bring about one iota of change in the energy factors or in the load factors of operation. On the other hand, in a system designed to change

the load factors of operation and the energy factors of a design and control, it does axiomatically follow that any ownership by individuals of the means of production and distribution of physical wealth would be abolished.

We are bringing this to your attention in order to show the great difference between the concepts of philosophic socialization and that of technological socialization. Only machines can reproduce machines and, as this social system continues to install more and more energy consuming devices, more technological equipment and processes will be introduced, thereby making more jobs for the machine and less and less for the human being. We in Technocracy think it is high time that we Americans of today face the fact that there never has been any virtue in toil. A continued application of more technology and more energy consuming devices will result in the continuous elimination of toil. The working class is fast disappearing and, when it goes, the bourgeoisie, too, will disappear as an exploiting class.

We have jotted down these few ideas in case you feel inclined to make further comment. We shall be glad to hear from you at any time and to send further literature.

Very truly yours,
TECHNOCRACY INC.

Howard Scott
Director-in-Chief

HS/GD

11515 39 Ave.,
Edmonton, Alta.
T6J 0M5

8 Sep 86

Continental Headquarters,
Technocracy Inc.,
Savannah, Ohio. 44874

Attention: Continental Director John T. Spitler.

Re: My letter of 19 Mar 86: "Has 'Technocracy' been Revised?";
Your letter of 21 Apr 86: "A question of Substance".

1. It appears from your letter of 21 Apr that you do confirm that there has been a revision of the original concepts of Technocracy (as I understand them) in order to accommodate, as you put it, "relative" degrees of scarcity and/or abundance.

2. Although your para. 6 denies there has been any revision, you continue to defend the revisions on the grounds that "maintaining the purity of thought of the original concepts of Technocracy is childish and untenable". Indeed! You dismiss my question as trivial, as "splitting hairs about the meaning of meanings". Would it were so! But I fear otherwise, or I would not have felt the need to write the letter. Your casual dismissal of the original concepts puts the subject of Technocracy into the realm of ideological and subjective interpretation, rather than being the scientific and objective construct intended.

3. It seems there is little to be gained in pursuing the subject of "revisions" further. But I must correct, for the record, some of the spiteful innuendos contained in your reply.

4. I did indeed resign in Feb. 1950, but not under the circumstances that you imply. My letter of resignation to Unit A, R.D. 11451, Calgary, dated 6 Feb. 1950, of which I still have a copy, stated:"In view of the circumstances of my employment I now find it necessary to terminate my membership in Technocracy. This is not an expression of position in respect to Technocracy per se."

5. "The circumstances of my employment" to which I referred were, at that time, critical. After war-time service at R.C.A.F. Station No. 3 S.F.T.S., Calgary, I was given a civil service appointment, on probation, as chief meteorological officer in the capital city of Regina. The weather station was an up-graded establishment with new staff and new responsibilities. As a senior civil servant and chief weatherman I had a public image to project and a heavy load to carry. During the war, you will recall, Technocracy Inc. was banned in Canada for a period of more than three years.

6. Following the lifting of the ban I was again active in the Calgary Section in several official capacities. I acquired a gray car with 'decals' and a gray suit. Then, in Sep. 1948, the "Chicago Conspiracy" erupted. I received the CHQ statement by Howard Scott, dated 28 Sep 48, at Regina. I was able to make an informed judgement against the "Program of the Chicago Conference for the Expansion of Technocracy" at that time. My position in that respect has never varied, which can be confirmed by other members associated with me over the years.

7. The "Chicago Conspiracy" was very disruptive to the organization and contributed to its decline in post war years. The Calgary Section itself issued a bulletin on 29 Sep 48 to all members, endorsing the ChicagoProgram and enclosing a form for a declaration of support. I was not in a position to challenge this, so I simply disregarded it. The solicitation was superceded on 23 Oct 48 by a bulletin from a newly appointed Board of Governors of the Calgary Section reporting the dismissal of members who supported the Chicago Program. My membership in the Calgary Section continued in good standing.

8. In Regina an inactive remnant of Technocracy Inc. disappeared in this turbulent period.

9. My letter of resignation of 6 Feb 1950 was acknowledged by Calgary Organizer Alex Gillespie on 11 Feb 50. (The Calgary Section had reverted to Unit status by CHQ order of 9 Jan 50.) He wrote: "You explain that in view of the circumstances of your employment you find it necessary to terminate your membership in Technocracy Inc. We understand the position in which you find yourself...".

10. Eventually and inevitably my career priorities yielded to approaching retirement. I took advantage of my new dimension of freedom to resume my membership and active support of Technocracy Inc. in March 1972. Prior to this I had heard, with dismay, of Howard Scott's death. I felt very remorseful that I had not carried out a planned visit to CHQ much earlier.

11. Prior to resuming my membership I wrote to my superiors in the Meteorological Service and to the Secretary of State of the Govt. of Canada to inquire about the government's view of Technocracy. To this date I have not had an answer to either letter.

12. All this record of my connections with Technocracy Inc., including the circumstances of the "22 year hiatus" was communicated to CHQ by letter on 1st March 72 in which I applied for membership. For some reason you have chosen to misrepresent the situation in your letter of 21 Apr 86, although the complete record must be present in in your files.

13. I re-iterate that my "span of interest in Technocracy and Technocracy Inc. covers some 50 years". It includes, of course, the 'hiatus' explained above. Your attempt to discredit a long-time member and supporter does a disservice to the organization and its administration.

14. I have no wish to detract from the splendid contribution made by a number of officers and members of Technocracy Inc. in establishing the new headquarters at Savannah, Ohio. It was 'invaluable'. However it does not justify any member or group of members assuming the mantle of Howard Scott.

15. Technocracy Inc. purports to be a scientific and functional organization. As such it should be able to engage in reasonable and constructive dialogue with its membership. This is felt to be lacking by other members as well as myself. In the interest of a dynamic and responsive organization I would advocate a more open and interactive relationship between CHQ and the field. (If its not too late).

Walt Fryers

Walt Fryers. MA·L

C H Q
TECHNOCRACY
INC.

TO: Walt Fryers
11353-A

April 21, 1986

SUBJECT: "A Question of Substance"

1. In your letter to CHQ dated March 19 you cite your qualifications as a savant-critic of CHQ policies today. You state your "span of interest in Technocracy and Technocracy Inc." covers some fifty years. You fail to mention the hiatus of some 22 years when you resigned from the Organization in 1950, coincidentally at the height of CCP action, until 1972 when you decided to rejoin. Apparently your 22 year absence from Technocracy has left a gap in your Technocratic education" that you,seemingly, have not been able to overcome.

2. During those 22 years in question, CHQ moved from New York City to Lamberville, New Jersey; thence from Lambertville to Rushland, Pennsylvania. Starting in 1952, an old dairy barn found on the property purchased was converted into the office building you saw when you visited Rushland in 1970.

3, From 1952 to about 1960, members from all over the Continent came to Rushland to work on converting the old barn into an office building. They would come on long weekends and spent vacation time to make the old barn into the substantial building you saw. The members put in long hours and worked hard, but they all felt it was worthwhile because they spent the long evening hours listening to the Chief. The subjects ranged from ancient history to any subject you would care to name. The "conditioning" the members received in these "rap sessions" was worth all the pain, sweat and sore muscles that went into the rebuilding of the old structure.

4. In the 1950s, when the building began, the word "abundance" in the lexicon of Technocracy had complete validity. The physical world of today is a far cry from the world of the '50s. For instance, basically,the western half of the United States is dependent on the waters of the Colorado River and its tributaries. Today, alarms are being sounded because there is not sufficient water to meet the demands of now, let alone a decade from now when the pressures of population and agriculture will have increased. The Imperial Valley is showing signs of saltation that cannot be halted. The water of the Ogallala Aquifer is being pumped out faster than it is being recovered. As a meteorologist, you can well appreciate this. These are some of the topics the Chief talked about during the "rap sessions." He predicted the saltation then and cited a number of instances in recent and ancient history to show the parallels of what we are doing today to foul our own nest.

ADDRESS: CONTINENTAL HEADQUARTERS, TECHNOCRACY INC., SAVANNAH, OHIO 44874

The Chief gave a lecture on May 4, 1963, at Cleveland, Ohio, titled "The Continuing Crisis" wherein he indicated the factors in the Continuing Crisis were water, arable soil, mineral resources, energy, technological equipment, population explosion and social revolution. In the lecture he developed the critical conditions with regard to the factors enumerated. That was in 1963. Today, in 1986, 23 years later, these conditions have worsened.

5. The problem with water in the eastern half of the U. S. is not shortage but pollution from the careless, criminal dumping of toxic wastes . In many areas the pollutants have seeped into underground water supplies of various towns. Streams are polluted beyond rehabilitation. Any projected water plans are for diversion of Canadian waters to the U. S. by Canadian and U. S. Price System interests. They are not the integrated Continental Hydrology of Technocracy.

6. Concerning the subject of your letter, "Has Technocracy been Revised?" The answer is no. You are reading in to the reprint "Price system Bind" something that was not there. The resource depletion data referred to the situation in the United States not the Technate area. The article further pointed out that when the total area of a Technate was considered, the conditions were still favorable for the installation of a Technate. Nit picking fault finding from within is something the Organization can do without; it is divisionary and disruptive. With respect to the use of the term "abundance," with the wanton Price System depletion of resources, it would be discretionary to soft-pedal the word. The resource situation at the time of the transition will determine the relative abuandance.

7. This is the physical world we are talking about. Millions of years went into the making of that world, but the wasteful practices of the Price System are making short work of it. The pressures on the finite resources, be it water, wood or mineral, are coming not only from the present population but from the so-called Third World countries for assistance. Their own populations are trying to enter the U. S. in unprecedented numbers. The tragic scenes being re-enacted in Africa today (Ethiopia and South Africa) are merely the prelude of disasters that are probable.

8. Your cavil about maintaining the purity of thought of the original concepts of Technocracy is childish and untenable. We first have to survive as a people. If we don't do this, all the rest is meaningless. Your arguments are akin to the clerics of the Middle Ages who argued about how many angels can dance on the head of a pin.

9. There are many 50 year veterans of the Organization who are still straining (without let up) to try to inform the general public of the tenuousness of our very existence. The staffs of The Northwest Technocrat and Technocracy Digest are not concerned with splitting hairs about the meaning of meanings, but they see they have a job to do and they are doing it.

10. Howard Scott died on January 1, 1970. You visited CHQ in the summer of 1970 at Rushland, Pennsylvania,and expressed a desire to be reinstated. Inasmuch as you showed no reservations at that time, your request for reinstatement was accepted. Upon reviewing the "attachments" which accompanied your letter of resignation as Treasurer of 11353-A, you obviously had reservations then, and apparently you still have them.

11. Since you obvously have been unhappy with your lot as an Organizer in the Field, and feel that you are qualified for better things, we suggest you resign from both "Technocracy and Technocracy Inc."

John T Spitler
John T. Spitler
Continental Director
Technocracy Inc.

JTS/skb

Unit A, R.D. 11353,
Technocracy Inc.,
11515 39 Ave.,
Edmonton, Alta.
T6J 0M5

7 April 1986

TO: Members of Unit A, R.D. 11353, Technocracy Inc.

SUBJECT: Report to Members re Status of Unit.

1. The resignation of Walt Fryers on 31 March 86 from the position of Treasurer concludes his 10 year stint of volunteer service to the organization of Technocracy Inc. in Edmonton.

2. In addition the positions of Organizer and Secretary are also open with the resignations of Howard Rennick (Organizer) and John Gregory (Secretary), effective 7 April 86.

3. The Regulations and By-laws of the organization provide for several options in the structure of local entities, depending mainly on size. In the beginning - Stage I starts with the appointment of an Organizer by CHQ (Continental Headquarters) to initiate action. Members joining at this stage are Members-at-Large (MALs). Stage II is reached when a minimum of six members decide to constitute a Group and change from MAL status to local membership. Stage III is achieved with a minimum of 15 members. The Group now becomes a Unit, and an executive is chosen consisting of the Organizer, a Treasurer and a Secretary. The final stage of local organization is reached when membership is a minimum of 50, and there is sufficient support to form a Section with a Director, Chief of Staff, Secretary, Treasurer, and 7 Governors of Committees: eleven officers in all.

4. The Edmonton activity reached Unit status in early 1981, mainly due to the impetus derived from having an office in HUB at the University of Alberta, manned on a part time basis by Walt Fryers. The office was lost to the Unit in 1984.

5. The future of the local Unit now hinges on the response of members willing to undertake the responsibilities of office. In the event of lack of volunteers the Unit will revert to Group status or to the unstructured state of individual MALs.

6. All members as of 31 Dec 85 were reported to CHQ as members in good standing for 1986. Membership cards have been issued in all cases. CHQ's share of annual dues ($5.00 per member) will be sent to CHQ shortly. If your 1986 dues are still outstanding please remit as soon as possible to the address on this letterhead.

7. If a membership meeting were to be called shortly, would you plan to attend and contribute your support and participation in the re-organization and operation of the Unit/Group?

8. The Edmonton Unit is currently in a holding pattern, with all assets in temporary storage in a member's garage. To avoid any further liquidation of assets, even in the short term, it is necessary that new premises or storage space be found for the accumulated records, furniture and equipment. A floor space of just 10' x 10' would serve for storage. Can you help with this?

9. Let us have your responses as soon as possible, by letter or telephone to:

Howard Rennick, 10818 81 Ave., Edmonton. T6E 1Y4. Ph. 433 0775; or
John Gregory, 6511 124 St., Edmonton. T6H 3V4. Ph. 438 4663; or
Walt Fryers, 11515 39 Ave., Edmonton. T6J 0M5. Ph. 434 4496.

10. The local decision as to any change in status will be communicated to CHQ by the end of April 1986, and all members will also be advised.

On behalf of the executive,

Walt Fryers.
Walt Fryers

11515 39 Ave.,
Edmonton, Alta.
T6J 0M5

23 March 1986

TO: CHQ

FM: W. R. Fryers, Treasurer, Unit A, R.D. 11353.

RE: Resignation as Treasurer.

1. This notice will advise you of my resignation from the position of Treasurer of Unit A, R.D. 11353, Technocracy Inc., Edmonton, Alta., effective 31 March 1986.

2. I have now completed 10 years of service to this Unit in various capacities. I propose to maintain a membership in Technocracy Inc., but without committment to executive responsibility or in any office of the organization.

3. Of course I will cooperate in winding up my present functions and in handing over as instructed.

W. R. Fryers.

cc H. Rennick, Organizer.
cc John Gregory, Secretary.

11515 39 Ave.,
Edmonton, Alta.
T6J 0M5

19 March 1986

TO: WHOM IT MAY CONCERN

RE: A personal position paper titled: "Has 'Technocracy been Revised?'

1. By letter dated 10 May 1982 I submitted my resignation as Organizer of Unit A, R.D. 11353, Edmonton. This was acknowledged and accepted in a reply dated 20 May 1982.

2. The reasons I gave for my resignation were several - 7 in all. In particular the last of these reasons demands some explanation and discussion in the hope that my differences with CHQ can be resolved to the benefit of all concerned.

3. To reiterate my position I quote from my letter: "I find myself in a position of increasing dissent in respect to some fundamental revisions and re-directions imposed by CHQ in recent years, and also in respect to some arbitrary and non-functional administrative techniques of this organization. Such unresolved differences constitute a disqualifying relationship for an officer of the organization."

4. CHQ did not bother to ask what these differences were, and I found myself too busy trying to sustain 11353-A (now as Treasurer) to follow the matter up, until now. The issues are too important to disregard any longer - important both to me and to the organization.

5. I am presenting my position in the attachments to this letter. It will be obvious from the record that my position has not been taken lightly nor my action taken in haste.

6. My span of interest in Technocracy and Technocracy Inc. covers some 50 years (from Fall, 1936). I was a charter member of Section 1 of R.D. 9749 in Winnipeg, and also Section 5 in that city. During the War I was active in the Section at Calgary, serving in several official capacities. More recently I have been a prime mover in the Edmonton re-activated Group and Unit, spanning a ten year period.

7. I plan to continue as a member of Technocracy Inc. in the belief that any mis-directions, as perceived by me, will be self-correcting. I believe that must be so as "Technocracy" is basically an interpretation of the physical world and the functional adaptations that are imposed on a highly developed technological society. I am optimistic, therefore, that the realities of the future will prevail within and without the organization.

Walt Fryers.
Walter Fryers.

Attachments: 3 pages.

HAS "TECHNOCRACY" BEEN REVISED?

-A question of substance-

It has always been my understanding that the concept of abundance is intrinsic and essential to the concept of "Technocracy". From the inception of the body of thought "Technocracy" in the 1920s and the early 30s, and the organization built upon it, "Technocracy Inc.", it was never otherwise, I would contend. (In contra-distinction, a "Price System" was defined as the mechanism in universal usage for the differential distribution of scarcity.)

It is disturbing to me, then, to note a tendency in the organization in recent years to revise the basic and original meaning and significance of "Technocracy" to accommodate the prospect of a continuing scarcity as envisioned in some quarters. Implicit in the revision is a rejection of the potential of science and technology to continue the historic advance toward an abundance. This revision has developed gradually, in stages, as the following record suggests:

- In September 1976 the Continental Director spoke at Vancouver, Canada, on the subject "Price System Bind". This was later published as an article in "Technocracy Digest" in November, 1976, and was subsequently adapted for issuance as an official "Article Reprint". The "Bind" emphasized in the article was the "threatening" shortage of minerals and other resources in the U.S. On top of the article's narrow concentration on nominal shortages, real or potential, the article limited its quantitative analysis to the confines of the United States. This, in itself, was a notable departure from the original continental base of Technocracy's presentations.

- Reiterating CHQ's new 'scarcity posture' was the front cover feature of the Northwest Technocrat of Oct./Nov./Dec. 1978, under the heading: "A New Set of Conditions". It reprinted key paragraphs from the article "Price System Bind". Again the emphasis was on "critical shortages of energy and minerals ...in the near future."

- Finally, on 5th May 1980, CHQ formalized this fundamental revision of Technocracy's original analysis in the General Mailing to Section, Units, Groups, and MALs. Para. 5 reads: "With the deepening resource crunch it is no longer appropriate to speak of the threat (or promise) of abundance. This point has been made clear in articles in our Magazines. A Technocracy will make possible the production and distribution of an adequate supply of goods and services, both efficiently and equitably."

So ended, it seemed to me, that great idea, which was the unique contribution of Howard Scott and his associates: a design for the distribution of an abundance of goods and services using an energy accounting system - which was to replace the differential distribution of a scarcity based on values, i.e. a Price System based on money.

The revision specifies: "distribution of an adequate supply... equitably", in lieu of the original concept of abundance. A dictionary definition of 'equitable': "equal in regard to the rights of persons; just; fair". By definition then, an 'equitable' system is a value system involving judgements of rights - i.e. a Price System.

'Equitable' social systems have been proposed before, dating back at least to Plato's 'Republic'. Modern ideologies promoting 'equitable' re-distributions are classed as liberal philosophies, or socialism, or even communism. Technocracy is none of these. It is not an 'ideology'. It is a recognition of physical circumstances, of a natural progression, the driving force being the capacity of North America for producing an abundance of goods and services for all citizens.

I dont doubt that a rationale will be offered for this revision. Presumably it would be based on the fear of an enduring and ineradicable scarcity from which even the rich North American economy could not escape. Whether this fear is reasonable or not, it is wholly improper to amend the Technocratic 'construct' to accommodate this assumption.

A condition of credible abundance is a requisite for a Technocracy. Without it there can be no Technocracy. This is the basic reason why Scott envisioned Technocracy primarily for North America and not for other areas. If a condition of abundance cannot be achieved, then Technocracy, as a 'modus operandi', is irrelevant. (The Technocratic concept of abundance requires amplification and is discussed in another paper. It is not a simple extrapolation of contemporary consumption characteristics.)

Another argument that might be put forward in support of the revision could be based on the contention that the technique of energy accounting, as suggested by Technocracy, could be used as a control for distribution even under scarcity conditions.

This is not a possibility! Under extreme emergency duress (equivalent, say, to military rule) the first distribution, or rationing, of consumer needs might be accomplished without a medium of exchange or a system of values. However no conceivable power or control could obviate the trading, exchanging, buying, selling, stealing and gifting after that. Scarcity must have its Price System to establish and maintain an 'equitable' distribution based on the accepted values of the society.

The social technique encompassed by the term "Technocracy" is not a philosophical projection or an arbitrary scheme of economics by someone of an ideological bent. It is simply the elaboration of physical trends and conditions imposed by a high energy, highly advanced society of continental dimensions. It is therefore not subject to arbitrary amendment or re-design to accommodate transient economic conditions or the expedient menipulations of administrators who happen to be the contemporary custodians of the concept.

In spite of the misdirection evidenced by the above noted revision, I expect the original concept will survive intact in the long run. Like other scientific constructs it will be self-correcting, because it is an expression of the physical conditions that determine its design. America's potential for 'abundance' is one of these.

Attempts to revise the concept can nevertheless do great damage to the organization "Technocracy Inc.", to the point of rendering it ineffective and irrelevant, for an indefinite period into the future, in its unique role of advocate and expositor. Although"Technocracy Inc." is a proprietory structure, the concept "Technocracy" is not a proprietory item and may not be redesigned by the contemporary 'owners/managers' of Technocracy Inc.

Therefore to ensure the integrity and continuity of "Technocracy" and "Technocracy Inc." I recommend that the revisions noted above be repudiated and the original specifications be reconfirmed. Only then will the presentation of Technocracy's message be unequivocal and unambiguous!

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19 March 1986.

P-2

'SECURITIZATION' OF THE DEBT STRUCTURE

(An up-date on the Ginnie Mae
phenomenon)

The 'Big Bank Bailout' continues. (See my paper: The Big Bank Bailout of 1980, 16 March 1985). Interest rates are being sustained at relatively high levels, providing a large spread between the inflation rate (around 4%) and going interest rates (around 10% or better). This enables the banking system to accumulate large reserves against which to write off huge amounts of bad debts, foreign and domestic.

At the same time, high interest rates generate great quantities of funds for investment in the hands of those with surplus savings and investment~~s~~ funds. There is limited physical growth in the economy to take up such funds. So they bid into the stock market. They scramble for RSPs and RRSPs. They swamp the mutual funds. They buy government paper. The Wall Street illusion of 'prosperity' continues.

New techniques to take up such funds are constantly being improvised. Stock is watered by new issues on existing plant. Mergers provide an illusion of growth. Shares continue to be diluted, as price-earnings ratios increase in a phoney 'bull' market. 'Ginnie Maes' (Government Guaranteed Mortgages), pooled mortgages, clustered mortgages, and other forms of guaranteed debt are offered to big investors (usually $10,000 and up).

And now, 'securitization' of virtually everything appears to be the future and penultimate form of 'financial inflation'. Doomsayers and such are disregarded. There is no place else to go for the ever-increasing overload of liquid funds for investment. The alleged growth in the economy is almost entirely in the exploding 'industry' of handling financial manipulations.

In the process the main burden of debt and debt creation has been transferred from banks to the security markets where it is vulnerable to market fluctuations, depreciation, default, and ultimately freeze and wipe-out when the day of final accounting arrives. 'Whom the Gods would destroy, they first make mad'.

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10 March 1986.

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Attachments:
- Press clipping, 10 Feb 86, "Securitization is demonstrating sweeping potential".
- Press clipping, 10 Feb 86 (approx.) " "Mutual fund sales soar to record in '85".

Securitization is demonstrating sweeping potential

BY DIANNE MALEY
The Globe and Mail

If you have $10,000 to invest, you may already be able to buy a share of your neighbor's mortgage. But if a trend that is sweeping the United States catches on in Canada, you may one day own a piece of your boss's car loan, your spouse's Visa bill — or the Third World's debt.

Securitization — turning loan assets into cash by issuing securities backed by them — has taken the United States by storm. Enthusiastic investment dealers who design the transactions say their potential is limitless.

Asset-backed securities owe their success partly to keen competition between two big New York-based investment dealers, First Boston Corp. and Salomon Brothers Inc. "If First Boston doesn't do the deal, Salomon will," one industry observer said.

In that hotbed of creativity known as the Euromarket, dealers are packaging and selling nearly everything on their clients' books. One company even managed to sell its bank line of credit — while still keeping the line open for its own use.

Interest rate swaps, which are part asset and part liability, are also being traded like securities, even though they carry the obligation to pay as well as receive interest.

Notes backed by car loans — CARs at Salomon — and the Sperry Corp. issue of notes backed by computer leases reveal how diversified the concept is. U.S. financial companies are able to spread the risk by passing their loans on to investors, who can't seem to get enough of them.

Selling receivables or using assets as collateral has been transformed from the last resort of cash-strapped companies to the first choice of borrowers seeking the lowest possible interest rates.

The U.S. Government started the ball rolling in the early 1970s when it formed a secondary market in pooled residential mortgages known as Ginnie Maes. The new securities paid investors a much higher yield than government bonds, yet still managed to save borrowers money.

In Canada, securitization is taking its first halting steps at GMC Investors Corp. of Toronto, which sells three- and five-year mortgage-backed notes in denominations of $10,000 and up.

GMC — which stands for guaranteed mortgage certificates — is a subsidiary of Counsel Trust Co., which is controlled by Toronto businessman Allan Silber. GMC certificates are guaranteed by Citibank Canada.

Prodded by the house building industry, Canada Mortgage and Housing Corp. is planning to back a similar program for banks and trust companies offering longer-term mortgages, but the legal and regulatory details have yet to be worked out.

Investment dealers who keep a close eye on the market say they would not be surprised to see one of the big lenders step into the mortgage-backed bond market soon, a prospect that GMC welcomes.

"As more companies move into the market, it will cause a downward move in interest rates," said GMC president Ivan Wahl. The interest rate difference between U.S. mortgage loans and government bonds has shrunk from 3.5 percentage points to 1.75 points in the past decade.

But with mortgage-backed bonds still in their infancy in Canada, the benefits of GMC's innovation go mainly to investors. GMC pays about half a point more than guaranteed investment certificates for its three- and five-year notes and eight-tenths of a point more than the yield on government bonds.

Mortgage borrowers, in contrast, save only about a tenth of a point by dealing with the company, although the saving would grow as the notes gained investor acceptance.

Surging growth in commercial real estate loans has made them ripe for securitization, and investment dealers have been quick to respond.

Salomon packaged $970-million (U.S.) worth of mortgage-backed notes for Olympia & York Developments Ltd. of Toronto and sold them to U.S. institutional investors. Salomon maintains a secondary market in the notes.

First Boston responded with $525-million in notes for top-rated General Motors Acceptance Corp. backed by the company's car loans. Like the O&Y deal, the GMAC sale was the largest of its kind.

Is a similar sale of receivables in store for General Motors Acceptance Corp. of Canada Ltd.?

"It's certainly something we have considered, but I don't think it's in the cards for Canada in the immediate future," said Paul Clare, manager of borrowing for the Canadian subsidiary.

Unlike their U.S. counterparts, Canadian lenders guard their loan assets jealously because of fierce competition among Canada's Big Five banks, trust companies and the 60 or so new banks that have come on the scene. "Our main focus now is to get assets on our books, not off," Mr. Clare said.

Non-financial corporations wanting leaner balance sheets could benefit from asset-backed securities, but questions linger about what form they might take in Canada.

To get the best returns, Canadian issuers would want to tap the U.S. market. But would U.S. investors want Canadian-pay securities? Or would borrowers raise U.S. dollars and swap them for Canadian currency?

Currency and credit risks and the tax implications of selling in the United States would have to be weighed carefully by prospective issuers and their underwriters.

"If one of these deals goes to market and flops, it's not likely you will see another one," an observer at a major investment dealer said.

Mutual fund sales soar to record in '85

BY MARTIN MITTELSTAEDT
The Globe and Mail

Mutual fund sales in Canada surged to their highest level in history last year as investors shifted massive amounts of cash into the stock and bond markets, according to figures compiled by the Investment Funds Institute of Canada.

The sales, after redemptions, reached a staggering $1.9-billion in 1985, about double the previous record of $981-million set a year earlier. In a mutual fund, many investors pool their savings and give them to professionals to manage.

"My business is up 100 per cent over last year," said David Oborne, a sales manager for retail investors at Toronto-based broker Nesbitt Thomson Bongard Inc.

He attributed the rush into mutual funds to the strength in the equity market, where stocks chalked up gains of 25 per cent last year, compared to the 6 per cent common for most bank accounts. An additional factor explaining the popularity was the federal proposal to allow Canadians to earn $500,000 in capital gains tax free, he said.

Other analysts pointed to the healthier economy. With fewer people unemployed, there is more cash around. "It goes with the economy. There are more dollars to invest now," said Terry Buddin, senior vice-president of Hodgson Roberton Laing Ltd., a Toronto-based investment counselling firm that set up two mutual funds last year.

The number of fund accounts — a figure roughly proportional to investor interest — rose sharply to 951,000, up from 778,000 a year earlier, according to the institute.

The total value of mutual funds last year was $10.1-billion, up 51 per cent from $6.7-billion in 1984. Institute members control about 85 per cent the money in the funds.

Mutual funds specializing in interest-yielding securities posted the strongest gains last year. The total in bonds and preferred share funds rose 84 per cent to $2.1-billion while the amount in short-term securities jumped 110 per cent to $1.5-billion.

Stock investments also fared well. The amount rose to $2.8-billion, up 33 per cent over the year. Foreign securities rose to $3.1-billion, up 40 per cent. Mortgages were up only slightly to $653-million, up 14 per cent.

According to Mr. Oborne, funds investing in portfolios of standard, top-quality Canadian stocks were the biggest hit. "The vanilla-type stock mutual fund is still the most popular," he said.

Ordinary Canadians also discovered the allure of foreign investment. While the stock market in Canada rose at a respectable 25 per cent pace last year, the rise in some foreign countries, such as West Germany, was more than 100 per cent when currency movements are included.

Worldwide Capital Management Ltd. of Toronto, for example, manages two offshore mutual funds, and its success has been dramatic. It raised $20-million in an initial offering last summer and is now gaining more than a $1-million a week in new money, merely by promoting itself more aggressively.

"The sales went from a few $100,000 a week to over a million" when we began marketing, said Richard Wernham, president.

The number of funds also rose last year, as the investment industry tried to meet the hectic demand. Members in the Investment Funds Institute rose to 154 from 115 a year earlier. New funds were set up to offer preferred shares, foreign stocks, convertible preferreds and real estate investments.

The popularity of funds might make some investors cautious — following the belief that when the public finally discovers the rising market, it is time to sell securities rather than to buy them.

But Mr. Oborne discounts this theory, in part because the rush into mutual funds has not hit a frenzied level yet. As well, the flow into funds, even though it is quite large, is only a small part of the total that investors are saving.

Mr. Wernham agreed. "My view is that we haven't yet reached the stage of excess."

He said some mutual fund buying may just be a shift in the money investors normally would have placed in the market. Earlier, investors would have bought individual stocks, but now they are using funds.

As well, investment dealers have begun to promote mutual funds actively. With the extra marketing effort have come larger sales.

Still, the companies offering the funds say a great, untapped market exists for their services. Mr. Buddin of Hodgson Roberton Laing said: "There's still 88 per cent of the Canadian public that doesn't deal with a broker or outside of a bank."

GOVERNMENT INTERVENTION ON A NEW SCALE TO RESUSCITATE AN AILING PRICE SYSTEM.

Pt. 1

"Ginnie Maes" Come to Canada.

The government-managed bail-out of a bankrupt Price System has grown to new dimensions with the introduction of the so-called "Mortgage-Backed Security" - the "MBS".

A better description might be: "Government Guaranteed Mortgages"! (Guaranteed for the lender, that is!)

The Financial Post of 17 Aug 85, under the headline 'Hot Investment Idea Comes to Canada', describes them as follows:

> "For a minimum investment of $5000 - $10,000 they (investors and financial institutions) will get a piece of paper that looks and acts much like a federal government bond. It will pay a fixed interest rate for terms of 5, maybe 10 or 15 years (to 25 - 30 in the US version), and will come with that same Govt. of Canada (or U.S., as the case may be) guarantee and comparable liquidity."
>
> "But the interest rate should be a bit higher than for Canada bonds or Guaranteed Investment Certificates (G.I.C.s) of comparable terms. And the security will pay monthly income - rather than semi-annual interest, as witth bonds and GICs".

These securities are patterned after the immensely successful "Ginnie Maes" (for Guaranteed Mortgages ?) of the U.S. which have financed more than half of all new mortgages in the US, valued at more than 85 billion a year.

So we find ourselves ever more in the land of "double=speak". The official line is: "get government out of business and let private enterprise carry the ball". That's the music. But the action finds government increasingly underwriting and aiding the private sector in a multitude of ways, of which this is but one.

The MBS scheme may well help to perpetuate and resuscitate, in the short term, this Price System of economics. If successful it could:

(1) stimulate the housing industry and its myriad of supporting industries and trades, including appliances and home furnishings, utilities, lumber, domestic services, and so on;

(2) provide a rewarding outlet to the vast pools of liquid funds accumulating in a stagnant economy. It is designed particularly for larger investors and institutions looking for secure and profitable opportunities for idle funds.

The trend toward longer mortgage terms, evidenced here in the MBS, as well as elsewhere, confirms the analysis that the economy is perceived to be in a period of major long-term deflation (dis-inflation) and declining interest rates. (In the reverse situation, one of anticipated rising interest rates, the strategy adopted would be ((and was)) one of short-term committments.)

Knowledgeable people, Technocrats among them, realize that continued credit (debt) expansion is essential to the survival of a modern Price System. Howard Scott, Director-in-Chief of Technocracy Inc., pointed this out in the 1930s, observing that when private enterprise no longer finds it profitable to create the new credit required for the continued operation of the Price System it is only just and meet that governments do it for them.

Now we have arrived at that very point in time again, in the 1980s. Governments are now embarked upon monumental deficit spending, on a multitude of bailouts of various enterprises and institutions, including banks, trust companies, farmers, etc., and upon a new scale of welfare benefits and make-work programs. And now, as with the MBS, government is subsidizing and guaranteeing private investment, even to the level of the individual consumer. (Remember that mortgages and investments in real estate have been major factors in the failure of a variety of banks, trust companies and other financial operations in the 1980s.)

There is no permanent cure here for a mortally sick economic system. This is no new 'modus operandi'. These measures can only buy time and so delay the showdown facing North America - the failure of our Price System of operation. Soon or late, we must face the challenge of installing an economy of abundance, energy based: the Technocracy.

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18 August 1985.

FINANCIAL POST 17 AUG 85

Hot U.S. investment idea comes to Canada

THIS IS the year Canadians should be able to buy their own mortgage-backed securities, the fixed-income investment which has become all the rage in the U.S.

For a minimum investment of $5,000-$10,000, they will get a piece of paper that looks and acts much like a federal government bond.

It will pay a fixed interest rate for terms of five, and maybe 10 or 15 years, and will come with that same Government of Canada guarantee and comparable liquidity.

But the interest rate should be a bit higher than for Canada bonds or guaranteed investment certificates of comparable terms. And the security will pay monthly income — rather than semi-annual interest, as with bonds and GICs.

An MBS will give the investor an interest in a pool of residential mortgages, originated by a private lender and insured by the federal government.

Canadians should get their first taste of this type of investment when **GMC Investors Corp.**, a subsidiary of **Counsel Trust**, goes to market this month with its "guaranteed mortgage certificates."

But that's the hors d'oeuvre for the main course, which should be served up later this year — the federal government's own mortgage-backed security program, designed by **Canada Mortgage & Housing Corp.** and patterned after the immensely successful U.S. Ginnie Maes.

But while the minimum investment in Ginnie Maes is $25,000, CMHC is planning on a $5,000 minimum, making it more accessible to individuals. The securities will have terms of five years and up.

Although the seeds of CMHC's program were planted by the former Liberal government in its February, 1984, budget, Conservative Housing Minister William McKnight has embraced the concept.

Earlier this summer, the minister said he hoped legal and legislative hurdles would be cleared by yearend, paving the way for the quick introduction of the government's program.

However, federal housing officials add that if the government's agenda is crowded, the launch could be delayed.

Policy-makers hope that mortgage-backed securities will go hand in hand with the introduction of 10-, 15- or even 20-year mortgages, which haven't been available since the late 1960s. Today's short mortgage terms — one, three and five years — are one reason so many homeowners were whipsawed by skyrocketing interest rates in 1981-82.

In the U.S., where mortgage terms extend to 25-30 years, mortgage-backed securities provide financing for more than half of all new mortgages, valued at more than $85 billion a year.

While the federal program awaits its go-ahead, GMC Investors Corp. will be selling its three- and five-year certificates. Individuals will be able to buy these in $10,000-$100,000 denominations, institutions in $100,000 chunks.

The certificates will be written on pools of CMHC-insured (National Housing Act) mortgages, which GMC will originate. **Citibank Canada** is providing a backup guarantee for prompt payment of interest and principal.

When Ottawa's program is launched, GMC Investors would hope to become a distributor of those securities as well, says President Ivan Wahl. He adds that GMC expects to sell $100 million in mortgage-backed securities in its first year.

Even so, there is wide consensus that mortgage-backed securities won't be nearly as big a factor in mortgage and capital markets here as they are in the U.S.

There are also questions as to whether they will help realize Ottawa's cherished goal — the financing of 10-, 15- or 20-year mortgages at a reasonable cost.

CMHC officials acknowledge that a number of factors have to come together. First, there must be demand for longer-term mortgages. Although several institutions, like **Bank of Montreal, Royal Trust** and **London Life Insurance**, offer seven- and 10-year terms, there is limited call for them now, lenders say.

That, however, could change if borrowers feel interest rates have bottomed out.

There must also be an ample supply of funds from investors. That will depend on the relative attractiveness of mortgage-backed securities compared with Canada bonds and GICs.

And finally, there must be some incentive for lenders to put together packages of their residential mortgages and sell them off to investors.

Financial institutions usually take in money from their depositors and lend it out to mortgage borrowers. The spread — often 1¾-two percentage points — between mortgage and deposit rates covers the lender's expenses and profit.

With business loan activity slow to recover from the recession, the major banks and trust companies have been eager to add resdential mortgages. They aren't likely to want to give them up to investors — unless business conditions change dramatically.

"The large banks and trust companies want to keep these assets on their books," says Tom Alton, president of **Bank of Montreal Mortgage Corp.** "We would generally be buyers rather than sellers [of mortgage-backed securities]."

"Why would the large financial institutions issue mortgage-backed securities? It's not in their vested interests," says Russell Hunt, vice-president and director of **Midland Doherty Ltd.** and a member of a joint industry committee which has been consulting with CMHC. "They would be cutting in on their own spread business."

In time, however, if larger numbers of homeowners want longer-term loans, big institutions may want to finance some of these loans through mortgage-backed securities — that is, if they can't sell the mortgages directly to institutional investors.

It is difficult to match 10-year loans with deposits of the same term. Depositors would demand a hefty premium for locking up their funds that long. And **Canada Deposit Insurance Corp.** does not insure terms of more than five years.

The big buyers of mortgage-backed securities are expected to be institutions. However, conservative individuals who like the monthly income and higher yields will be attracted.

The expectation of higher yields is drawn from U.S. experience, where mortgage-backed securities have generally paid at least ¾ of 1% more than comparable Treasury bonds.

At GMC, Ivan Wahl says his certificates should return about half a percentage point more than GICs and Canada bonds of the same term. Because the pass-through of the mortgage to investors is "an efficient process," he says, rates on GMC's mortgages should also be a tad lower than at major banks and trust companies.

However, as an investor, you can expect extra complications with this kind of security. The monthly cash flow won't consist of just interest. You would receive a pass-through of blended principal and interest.

Because some mortgages in the pool are partly or fully prepaid before maturity, you would take in dribs and drabs of principal, which you'd have to reinvest.

And if you're going to commit your funds for 10-15 years, you'll want assurances of liquidity. That will come if there's a sizeable secondary market, where securities can be readily bought and sold. Presumably, stockbrokers would make this market, as they do in the U.S.

Also, you'll want to be guaranteed prompt payment every month — even though some of the mortgages in the pool may be in arrears.

Under Ottawa's scheme, the security issuer would initially provide this guarantee. And if the issuer couldn't come up with the necessary funds to meet his obligation, CMHC would follow through with its "timely payment guarantee." (Under GMC Investors' program, Citibank Canada provides this second line of defense.)

The risks of mortgage prepayment are particularly acute. The Canada Interest Act permits homeowners to prepay their mortgages after five years with only three-months' interest penalty if the loan's original term is more than five years.

This clause in the Interest Act has scared most financial institutions out of lending for longer than five years. Presumably, investors in long-term mortgage-backed securities would have the same qualms.

Investment dealers say the Interest Act should be amended to remove this disincentive. Otherwise, mortgage-backed securities would have to carry hefty interest rate premiums, which would defeat the purpose of low-cost, long-term mortgages.

McKnight has said he will push for amendments in the act, but he has not indicated exactly what they would do. One option would be to require that when a mortgage is prepaid, the borrower would compensate the investor for any lost interest for the rest of the mortgage term.

-FOR NORTH AMERICA-
WILL IT BE SCARCITY ? -OR- WILL IT BE ABUNDANCE?

'Technocracy' is a design for the distribution of an abundance of goods and services. It has always been projected as the ultimate replacement for the present 'Price System', which is a value-based system for the differential distribution of scarcity.

A 'Technocracy' would require an assured and credible condition of abundance in which to operate. At this stage of history that is a condition conceivable only for the North American continent: U.S. and Canada.

The question arises: Do we, in North America, really have the resources for it?

The answer, I submit, is 'Yes'.

Of course this continent does not possess every resource in abundance - tin, for example. But most essential resources are in adequate supply, given prudent management. Through trade and substitutions, exploration and stock-piling, and especially through research and technical advances, the shortages can be handled. Much of the earth's surface and upper layers are still to be explored, even on this continent.

The over-all strength of the economies of U.S. and Canada, in comparison with other areas, are most readily measured by the rate of energy conversion. On this basis, the strength of our economies, on a per capita basis, measures over double that of Europe as a whole, and about a third greater than that of the USSR. (Reference: UN Statistical Year Book 1982, and UN Energy data for 1983.)

The attached press reports tend to confirm our resource position, and to contradict the 'scarcity psychosis' perpetuated by the spate of doomsday books such as 'The Limits to Growth'. Most of these books came out in the 70s - a period of inflation when it seemed too many dollars were chasing too few goods. Remember the pitch: 'Buy land - they're not making any more!' Typical of the times!

It is well to remember that inflation feeds upon perceptions of scarcity, real or unreal. And conversely, fear of scarcity supports inflation, to the great profit of market manipulators. So it was, in the 70s.

Now it is the 80s - a period of apparent surpluses, and disinflation. The past period of unbridled foreign trade is ending in a welter of unredeemable bad debts. America is no longer outward-bound, following the lures of easy credit and 'favorable' trade balances. As has been said: 'It is folly for America to squander its resources on the 'harpies' of foreign trade. Sooner or later they follow the flag back home' - and we are wiser but poorer.

Now, at last this continent can put its own house in order. Our potential - our capacity - is no less than a Technocracy, an economy of abundance. It will be a major social change, the greatest in history. But it must be faced. Soon.

Attachments:
  Press clipping - 1983, 22 Nov.
  Press clipping - 1984, 24 Jan.
  Press clipping - 1985, 16 Jan.

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26 Feb 1986 ?

'Mineral-famine' forecasts fade, substitutes found

By **STEPHEN STRAUSS**

Teacher to student: Who has the biggest underground copper reserves in North America?

Student to teacher: The American Telephone and Telegraph Co.

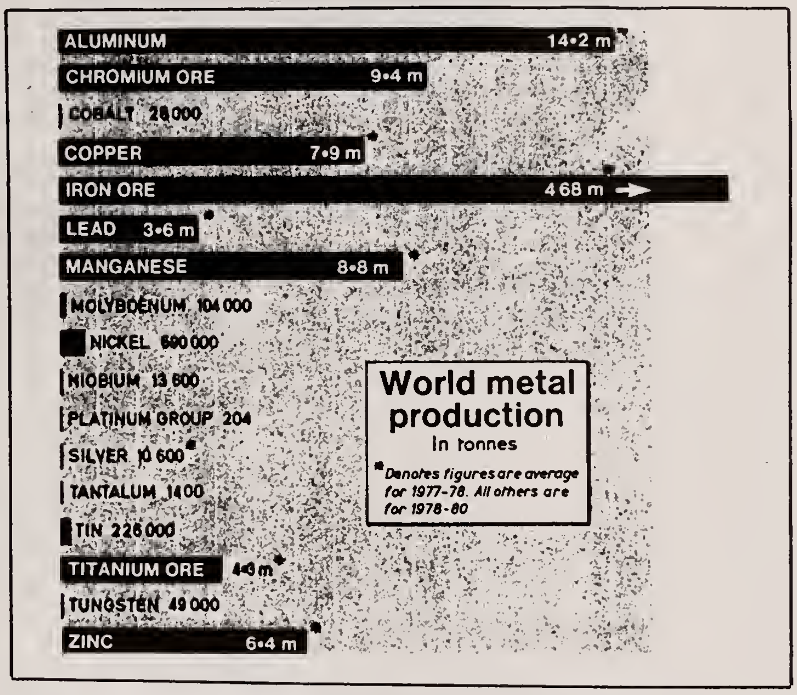
THE IMMENSE problems of measuring when and if the world is running out of its minerals is contained in a truth buried in the above wisecrack: one indeed may soon be mining AT&T's multi-tonne copper reserve.

Rare copper, which on average appears only in 50 grams per tonne of the Earth's crust, is on the verge of largely being replaced in future telephone systems by fibre optics. The later is glass-based technology which uses a non-metal silicon, so abundant — it appears on average in 460 kilograms per tonne of the Earth's crust — that its quantity is for all intents and purposes infinite.

The result of this eventual replacement will be a veritable Eldorado of pure but second-hand copper coming onto the world's metal markets — a supply which analysts suggest will dramatically reduce the mining of the metal.

The use of already mined minerals is just one of the reasons most experts view the predictions of imminent mineral shortages which surfaced in the early 1970s as more snarl than bite.

> *'There is a saying in geology once metals are up, they stay up'*



Iron is not only the most plentiful metal, but it also takes care of most of world's ore needs. Aluminum is second.

Studies done for the Washington-based Resources For the Future, and the Ontario and Canadian Governments predict no serious shortages this century. Even the Club of Rome (a group of leading businessmen and others concerned about world problems), whose best-selling 1972 book, The Limits of Growth, triggered soul-searching about an imminent mineral shortage, has backed off its predictions.

"The minerals section was the weakest part of our projections," said British scientist and Club of Rome founding member Alexander King in a recent interview.

The sense among experts is that not one but a number of trends and changed perceptions will stave off mineral famines even as the world population shudders toward its predicted 8 billion or 12 billion mark in the next century. For example:

- With the exception of mined gases, such as helium, the possibility of recyclage applies to many minerals, including gold and silver which have been adorning arms and necks for thousands of years. "There is a saying in geology that once metals are up, they stay up, except for the odd ship that sinks," said Gerhard Anders, a senior policy adviser with the Ontario Ministry of Natural Resources.
- Twelve elements — oxygen, silicon, aluminum, iron, calcium, magnesium, sodium, potassium, titanium, hydrogen, manganese and phosphorus — make up more than 99 per cent of the Earth's crust. These are considered to exist in quantities ranging from immense to virtually infinite.
- While the remaining 88 naturally appearing elements exist in the 10-50 kilometre-thick mantle of the Earth's crust in trace proportions, their use is also very limited. In 1974, the metals in large quantity supplied 96.5 per cent of the world's needs, including a whopping 91 per cent for iron.
- In three centuries, improved extraction techniques have been dramatic. The amount of copper needed before an orebody was economically mineable fell from 13 per cent in the 1700s to as little as 0.24 per cent today.
- Even for relatively rare metals, there is often a fairly ready substitute if scarcity drives prices up. For example, when political unrest in Zaire led to a ten-fold increase in the price of cobalt, many manufacturers looked to ceramic materials to replace it in magnets. The U. S. National Aeronautics and Space Administration is researching the substitution of nickel for cobalt in jet engines. The amount of tin used has declined dramatically in recent years as aluminum replaced tin in cans. "There is a substitute for virtually everything," said Mr. Anders.
- The per capita use of minerals in industrialized countries is not increasing, and there is no sign that most non-industrialized countries have overcome internal problems which keep their mineral consumption down.

GLOBE + MAIL — 22 NOV. 83 p. 2. "MINERAL-FAMINE FORECASTS FADE"

- Reserves continue to increase faster than useage and the relative price of some rare materials — copper for example — have actually decreased over the past century.
- A great deal of the planet's surface remains unexplored — perhaps as much as 90 per cent of Canada — while ocean floors and polar regions still are virtually untouched.
- Techniques for looking below the ground for ore deposits that don't break the surface are primitive. Jan Zwartendyk, director of the resource policy division for the federal Department of Energy, Mines and Resources, says 10 metres is about the limit of accurate subsoil forecasting. "We simply have to learn to see deeper than we have before," he added.

The relative ease of substitution, jealousy among producers, and discoveries of alternate sources of minerals probably means that OPEC-style metals cartels are not in the offing. "The people who produce or could produce a cartel just don't have any unity of purpose," said Mr. Zwartendyk.

'People who produce or could produce a cartel . . . don't have unity'

While strategic stockpiles continue to exist — the United States has hoarded $12-billion worth of 94 rare materials used in manufacturing — they are generally viewed as a safeguard against temporary dislocations caused by war or revolution and not a long-term solution to mineral depletion. One problem with a stockpile's long-term value is that what may seem vital one day is made technologically obsolete the next. For example, the U. S. Government has decided that $2-billion worth of tin and $2-billion worth of silver are no longer needed.

Another problem with large-scale stockpiles is that keeping minerals in reserve is uneconomical, according to historical analyses by the Ontario Government Ministry of Natural Resources.

All of this is not to say that eventually there won't be a depletion of readily mineable deposits of certain rare minerals and eventual shortages of them. Corrosion, abrasion, and difficult-to-reverse mixing of materials mean that the amount of recycled material will inevitably decrease.

Furthermore, a Yale University geology professor, Brian Skinner, has put forth a theory that says as one exhausts large-scale mineral deposits, the amount of energy needed to separate out the rare minerals in smaller amounts will make it economically impossible to use them.

The energy needed to obtain new minerals could dampen future hopes for energy production. Prof. Skinner suggests that niobium needed in the production of giant magnets essential for atomic fusion energy plants may cost 10,000 times the price of the energy produced.

At the same time, he says, the large-scale deposits are already becoming increasingly harder to find.

The solution to this long-term mineral crunch — Prof. Skinner sees a copper shortage by 2050 and silver and gold shortages sooner — is what he calls "a new iron age."

"When it dawns, we will have to learn to use iron and other abundant metals for all our needs."

Two possible ways of forestalling shortages — mining the sea floor and mining asteroids in space — are seen in a different light. Some form of sea-bottom mining is seen as inevitable, while attempts to bring minerals from outerspace are still viewed as highly speculative.

EDMONTON JOURNAL
24 Jan 1984

Edmtn Jrnl. 24 Jan 84.

Busin

Rare metals find called promising

By ED STRUZIK
Journal Northern Bureau

YELLOWKNIFE — Huge deposits of rare metals found at a remote site 100 km east of here could turn an Alberta-based company into a major supplier of the electronic and strategic arms industries.

The find could also give the Northwest Territories the world's largest producing beryllium mine, with its employment and other economic benefits.

Highwood Resources Ltd. of Calgary virtually stumbled on the deposits of beryllium. niobium, tantalum, zirconium, and yttrium when their metals expert, David Trueman, was leafing through a 1978 geological report.

"Apparently, nobody bothered to follow up on it although it looked very interesting," says Trueman. "So I proposed a sample program this past summer and the results of that exceeded our expectations fourfold. Geologically, it turned out to be a very unique deposit."

Although all the metals found so far are economically promising, the company is particularly high on the beryllium prospects. Beryllium has several unique properties including high thermal conductivity, high strength, light weight, and corrosion resistance. The mine and possible beryllium hydroxide plant could begin production in two years employing as many as 50 people, Trueman says.

GLOBE & MAIL
16 Jan 1985

U.S. urged to raise self-reliance

GLOBE & MAIL 16 JAN 85.

Canadian Press

WASHINGTON — The United States is too dependent on potentially unstable and unfriendly countries for supplies of four important metals that are essential to the peacetime economy and crucial during wartime, the U.S. Congress has been told.

A report by the Office of Technology Assessment recommends reduced U.S. reliance on southern African countries and the Soviet Union for the four metals — chromium, cobalt, manganese and platinum — which are produced only in tiny quantities in the United States. Imports of these metals costs the United States more than $1-billion (U.S.) annually.

The report recommends branching out to other producers, including Canada, and trying to reduce demand for strategic metals by finding substitutes, recycling scrap and waste metals and developing cheaper domestic production techniques.

Canada is recommended as a friendly country from which the United States could import more cobalt, a nickel-copper byproduct, and as a secure supplier of iron ore and scrap from which manganese can be obtained.

But a 1968-69 strike by Canadian nickel miners is cited as an example of how U.S. dependence on other countries for strategic metals puts it in a generally vulnerable position. The report says the Canadian strike "shut down supplies from the quintessentially 'safe' foreign source."

The Canadian strike is cited as one example of how, during the past 25 years, the United States faced disruptions of metal supplies that are not widely produced domestically but are critical to the economy and national defence.

Other examples of disruptions were a Soviet embargo on exports of manganese and chromium to the United States during a 1949 Cold War trade battle, an international embargo on purchases of Rhodesian chromium in 1966, and a cobalt price burst in 1978-79 caused by panic buying after a rebel invasion of Zaire's mining region.

"Reliance on a potential adversary such as the Soviet Union for materials essential to defence and industry is an obvious area for concern," the report says.

Strategic metals are used for a variety of purposes, ranging from strengthening the resistance of steel to building jet engines and auto parts.

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9 Feb 86

TO: CHQ
FM: Walt Fryers
RE: Clipping from N.Y.Times of 22 Jan 86

1. Thanks for sending this copy of Lester C. Thurow's column: "The 20's and 30' Can Happen Again".

2. It is a powerful write-up on the contemporary critical juncture of world and US economics. I would submit the folowing comments.

3. First, the title. It might better read: "The 20's and 30's Have Happened Again". The column itself supplies much evidence for that verdict. The key difference from the '30's is in the government's (and the Federal Reserve Board's) control of interest rates and the use of that control to validate the debt structure. Interest rates are being maintained high, but there is no comensurate growth in the economy. The interest rate is totally artifical and has become the government's foremost device for intervention in the market place of the so-called free economy. The result is a continued growth in the debt structure, in the return on money invested, in the accumulation of liquid funds seeking opportunities for investment, in a frenzy of stock market activity, and finally in the need for the government to re-cycle such funds in the form of deficit spending, defence spending, and a myriad of support and bailout programs.

4. The Gramm-Rudman law for the reduction of the deficit is a political sham. It is intended to get the government past the 1986 elections with a façade of fiscal 'responsibility'. But events may well provide an anticlimax to that objective. Disinflation is accelerating with the collapse of petroleum prices. This may precipitate a series of new crises, including an aggravated bank crisis. This might be met again, as in 1981, with a run-up of interest rates - a 2nd Big Bank Bailout. Or, as the residual inflation rate declines further, by simply maintaining a wider margin in the difference between the inflation (or deflation) rate and the official interest rate. And the consequence will again be a deepening world recession, that should qualify it for the term 'Depression'.

5. Thurow mentions: "Give any banking system enough nonperforming loans and it will crack: it must pay interest to its depositors but has no income." Well, the bailout technique worked in the 1981 crisis. It returned the banks nominally to profitability (most of them). It enabled them to set aside huge reserves against losses. The spin-off was a severe recession, but most banks were saved. They will be again. They are very heart of the Price System.

6. Thurow writes further: "This country entered 1986 with $100 billion in international debt, borrowing $150 billion a year to finance its trade deficit..." The trade deficit, as generally recognized, is a consequence of high interest rates, which resulted in high US dollar values. Investment funds from abroad flowed in, stimulating further the US dollar, the US economy, and subsequently, increased purchases from abroad and slower export trade for the US. This is an indication of the strength of the US economy, and not of weakness. One effect was to give a much needed boost to the export trade of some other countries, supporting them in their own economic crisis. In that sense, it amounts to a form of foreign aid. It may have to be continued and increased as an ameliorative measure in the new world crisis now brewing. The US economy is still, indeed, the locomotive economy of the world. All this hangs precariously on the high interest rates engineered by the US Federal Reserve Board. It is an expedient measure, and no permanent solution.

7. Again, the Thurow column is excellent and deserves wide circulation. If anything, it understates the threat. And it offers no solution.

Walt Fryers.

Walt Fryers.

NEW YORK TIMES 1-22-86

The 20's and 30's Can Happen Again

By Lester C. Thurow

CAMBRIDGE, Mass. — I am often asked whether the financial panics of the 1920's and the Great Depression of the 1930's could happen again. For 20 years, I have answered that what happened then could not happen now. Today, I would not so answer.

The loan portfolios of American banks include more than $500 billion in farm and third-world debt, where default is easily imagined. As oil prices fall, what were good oil loans are rapidly becoming bad ones. Major banks are sinking under the weight of falling real estate values. Mergers and leveraged buyouts lead to firms that can barely meet interest obligations in boom periods and that could not meet them in a recession.

Give any banking system enough nonperforming loans and it will crack: It must pay interest to its depositors but has no income.

Government compounds the problem by refusing to recognize that it has a duty to insure honesty and a safe place to park one's money. Fraud has played a role in many of the banking collapses that have already occurred, and the citizens of Maryland and Ohio know that their money is not safe. Government insurance funds are minuscule in comparison with probable losses. The public thinks it has the full faith and credit of the Federal Government behind it, but legally it doesn't. The net result is a banking system that is surely as fragile today as it was in the 1920's.

Financial markets are filling up with instruments — junk bonds, index futures, bundled mortgages — and the participants understand what they are buying and selling just about as much as they do when they are playing a hand of poker. One can easily imagine a default, say in the junk bond market, that would bring the salability and hence liquidity of these instruments to an abrupt halt. Yet everyone — consumers, businesses, Government — continues to go into debt at record rates.

A nervous stock market booms while the economy sags. Stagnation, farm bankruptcies, financial speculation, nonperforming loans, large potential defaults, falling real estate values (remember the Florida land boom and bust of the 1920's) — the echoes of the Great Depression sound louder and louder.

In the 1980's, international debt and not the stock market is apt to be the hammer that shatters a fragile financial system. This country entered 1986 with $100 billion in international debt, borrowing $150 billion a year to finance its trade deficit and being able to violate the first commandment of a Swiss banker: "Never lend money to someone who must borrow money to pay interest." By 1989, America will owe more than $600 billion to the rest of the world and have to pay more than $60 billion in interest payments — a sum that will require the annual output of 1.5 million workers.

Just as no one could predict when the stock market would crash in the 1920's, so no one can predict when the foreign lending will stop in the 1980's. But stop it will, for no nation can forever borrow ever larger sums. Since the world's wealthiest nation has never been the world's largest debtor, and since the world's reserve currency has never been held by a debtor nation, no one knows the thickness of the financial ice upon which the world is skating, but any unwillingness to continue lending hundreds of billions of dollars, much less an abrupt shift out of dollars, would create an instant liquidity crisis.

Yet as my colleague Charles Kindleberger, an economist, has pointed out, there is today no international lender of last resort. Would conservative governments be willing to instantly lend hundreds of billions (Japan and West Germany to the United States; the United States to its banks) and effectively nationalize the world's financial markets in the event of a run on the dollar? To do so would be to violate the deeply held principle that free markets take care of themselves. But not to do so would be to watch the system collapse.

It is not hard to imagine that governments will do too little too late if what must be done involves massive interventions violating their own principles. Each government marches on as if it could still go it alone. But "every nation for itself" might have been the motto of the late 1920's.

Societies have a tendency to make fundamental mistakes at 60-year intervals, since everyone old enough to remember the previous mistake is by then either dead or senile. Sixty years ago, the world was marching toward financial disaster. To pretend it cannot happen again and that governments do not have to act to protect the integrity of the system is to guarantee that it will happen again. □

Lester C. Thurow is professor of economics and management at the Massachusetts Institute of Technology.

11515 33 Ave.,
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28 Mar 86

TO: CHQ

FM: Walt Fryers

RE: Population.

1. Your communication of 18 March is acknowledged, with its comments on the population question. Thank you for the up-dated tabulation of world populations.

2. The fate and future of America and Technocracy will be decided primarily by the United States, in concert, now doubt, with Canada. Central America, while peripherally involved, will not be - cannot be - a deciding factor.

3. The relevant populations, then, are those of U.S. and Canada. Scott inferred that the U.S. might go it alone, but most probably in conjunction with Canada. Other areas and populations could elect association as they developed to comparable status. The criterion of development most probably would be the level of energy consumption per capita, targetted to be around 200,000 Kg.Cal. per capita, per day. Central and South American countries will not approach this figure in the near future.

4. Thus the continental reference in Technocracy usually means U.S. and Canada as the initial operating unit of a Technate. However, in other contexts the continental overview embraces the larger area, for defence purposes,for instance (a modified Munroe doctrine).

5. The early estimates of optimum population are not necessarily final. There is as yet no sign of a stable equilibrium in population. It ebbs and flows with the fortunes of the Price System. The U.S. and Canada now seem to be entering a period of declining growth rates and there are signs of negative growth in the future, reminiscent of the 30s. Our combined population was about 140 million in 1937 (Technocracy Study Course) and is now around 264 million in 1985, according to the data you provided. (Perhaps we could yet see a Technate serving a population of around 200 millions citizens of the U.S. and Canada?) Energy conversion rates of 200,000 Kg.Cal. per capita per day have been maintained in this area and even exceeded in recent years, indicating an accommodation to a larger population.

6. You make reference to Robert E. Cooks' book: "Human Fertility" to support the linking of human propagation to education. Too bad Cook didn't have the Technocratic insight to link it with energy conversion per capita, and thus to recognize education as a derivative factor rather than a primary cause in population dynamics.

7. It would be a mis take to think Central and South American nations will determine the future of U.S. and Canada. With much lower energy conversion rates they cannot get in gear and mesh with the U.S. and Canadian environment. Technocracy must focus on the U.S./Canadian situation where the application of Technocracy may become possible. The shores and boundaries of the initial Technate area would be sealed and controlled, of necessity, until such time as a larger integration became a possibility. (The present attempt to close the Mexican/U.S. boundary is a deliberate farce, allowing certain enterprises to benefit from cheap labor.)

8. Diversions of interest and action on the part of Technocrats in the direction of global causes, third world dilemmas, wild life preservation, environmental desecrations, etc., while worthy and vital concerns in themselves, are still diversions from the basic program of Technocracy and should be recognized as such.

9. Right now I am apprehensive that military excursions will be initiated and/or expanded to offset the economic crisis that is facing the western nations.

Walt Fryers.

CHQ
TECHNOCRACY
INC.

TO: Walt Fryers, Treas.
11353-A

March 18, 1986

SUBJECT: Population

1. We read with interest the clipping from the Edmonton Journal on Canadians dying out. When Technocracy hit the decks in the '30's it was indicated that the optinum population for a Technate would be 200,000,000. At the present time the population of the area is more than double the optimum amount (448.75 million) and unfortunately the greatest increases are occurring in the Third World nations (Mexico, Central and South America.)

2. You will note that all of the western nations have a low natural increase rate: U. S. .8, Canada .7, Denmark 0.1, Norway 0.2, Sweden 0.0, U.K. 0.1. The situation comes down that those nations with a lower education standard are the biggest propagators. Robert E. Cook in his book HUMAN FERTILITY points out that in the U. S. an area crescent moon shaped in Appalachia area where there is a low educational standard, the propagation was higher than other areas. The problem then becomes one not only of quantity but also quality.

3. At CHQ we subscribe to the POPULATION REFERENCE BUREAU service and we periodically get data from them. I have included a copy of the most recent population chart CHQ has received.

John T. Spitler

John T. Spitler
Continental Director

JTS/skb
Encl.

ADDRESS: CONTINENTAL HEADQUARTERS, TECHNOCRACY INC., SAVANNAH, OHIO 44874

Canadians dying out, study says

By JOHN GEIGER
Journal Staff Writer

Canadian society is dying out and sterilization rates are partly to blame, Canada's first-ever national fertility study shows.

Canadian Fertility Study results obtained by The Journal show that sterilization has replaced the pill as the leading means of contraception among Canadian women between 18 and 49.

Karol Krotki, a University of Alberta demographer, says the study he conducted with researchers at the Universities of Montreal and Western Ontario shows Canadians behave in a "bizarre manner" when it comes to birth control.

"Canadians are not interested in reproduction. They are not interested in children. This has already had a very profound effect for the last 13 years and will continue to have. The Canadians started dying out in 1972," said Krotki, "The average mother is producing three-quarters of a daughter."

"This is an extreme attitude. Canadian society behaves in a bizarre way. What it seems to indicate is the decline and eventual disappearance of Canada."

Canada leads the world in sterilizations on a per capita basis, he said.

The Canadian Fertility Study, conducted by phone in 1984, is considered representative of Canadian women and is based on 5,315 respondents across the country.

Of the 68.4 per cent of Canadian women ages 18 to 49 who use contraception, 48 per cent are using sterilization. Of those sterilized, 35.3 per cent were women and another 12.7 per cent have a male partner who has been sterilized.

The pill is used by 28 per cent, condom by 9.1 per cent and IUD by 8.3 per cent. All other methods including diaphragm, foam, rhythm method and withdrawal account for 6.6 per cent.

The sterilization figure is 60 per cent for married couples using contraception.

"Furthermore, (others) were just about to get divorced. The recklessness is so incredible. Maybe people don't think far enough ahead, or maybe they definitely say they don't want children," Krotki said.

"In comparison with the high reliance on sterilization, all the others (methods of birth control) are pale facts. It is amazing that a gadget-minded society, which has so much equipment in each kitchen, would employ such a crude contraceptive measure as sterilization and abortion. The incidence of abortion is also very high.'

It is possible that disappointment with the pill makes people move towards sterilization.

No national data is available for use of the pill in the past, however 48 per cent of Alberta women using contraceptives relied on the pill 11 years ago, said Krotki.

Krotki said women were not asked directly if they had undergone an abortion. Instead attitudes toward abortion were explored, revealing "conservative" views among Canadian women.

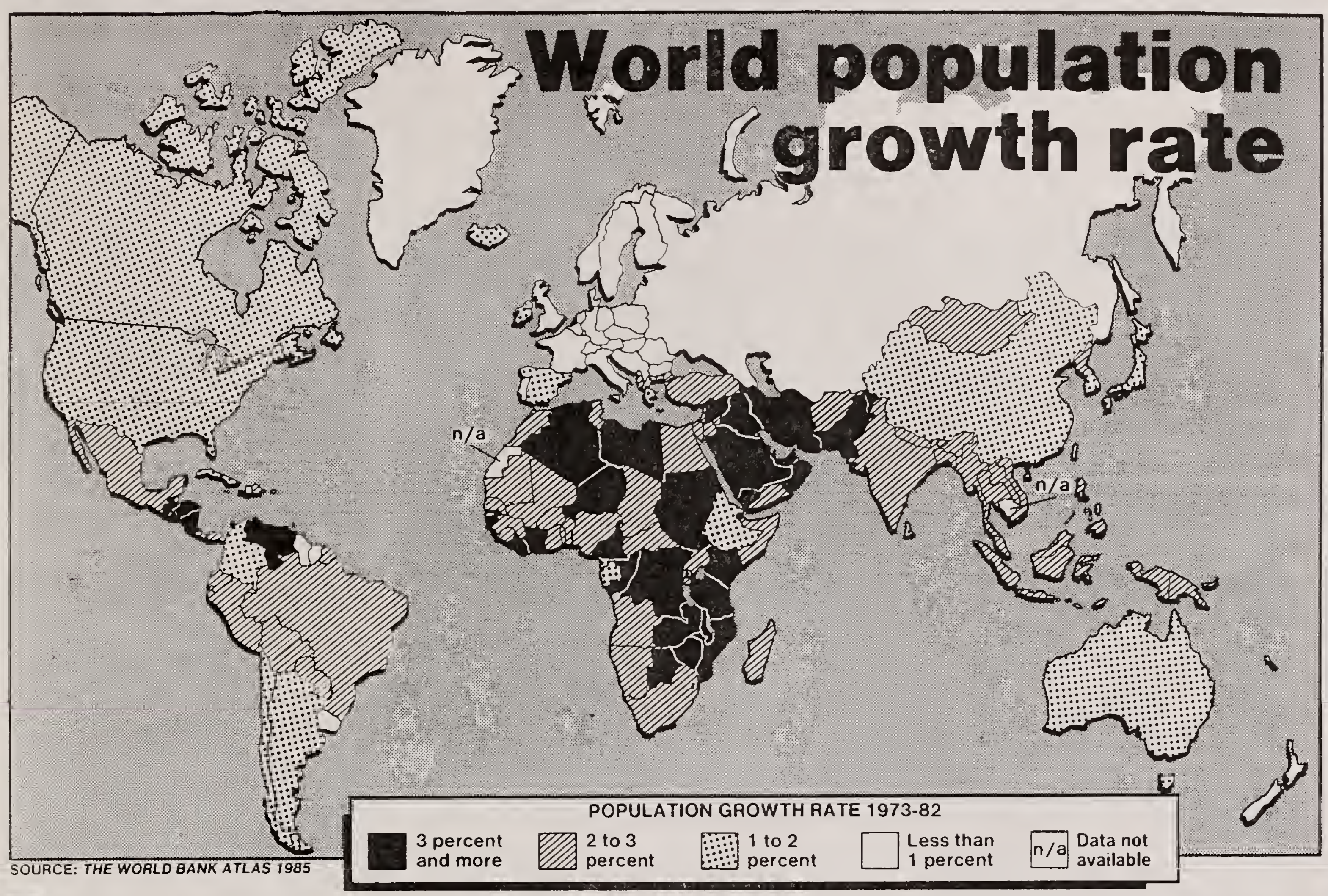
EDMONTON JOURNAL

19 FEB 86

		POPULATION	
WORLD	4,471	4,414	4,845
	EV.FUND 1981	POP REF BUR 1981	1985
North America	252.4	247.0	264.0
Bahamas	.24	.2	.2
Barbados	.27	.3	.3
Brazil	1.00	1.0	1.5
Columbia	26.9	26.7	29.4
Costa Rica	2.2	2.2	2.6
Cuba	9.9	10.0	10.1
Dom Rep	5.4	5.4	6.2
El Salvador	4.7	4.8	5.1
Guadeloupe	.34	.3	.3
Guatemala	7.0	7.0	8.0
Guyana	.85	.9	.8
Honduras	3.6	3.8	4.4
Haiti	5.1	5.8	5.8
Jamaica	2.2	2.2	2.3
Martinique	.34	.3	.3
Mexico	71.8	68.2	79.7
Netherlands Antilles	.26	.3	.3
Nicaragua	2.6	2.6	3.0
Panama	1.9	1.9	2.0
Puerto Rico	3.4	3.5	3.3
Suriname	.39	.4	.4
Trinidad/Tobago	1.1	1.2	1.2
Venezuela	13.9	13.9	17.3
Iceland	.23	.2	.2
Greenland	.05	.05	.05
TECHNATE POPULATION	419.97 million	410.15 million	448.75 M

Story in a map

World population growth rate



SOURCE: *THE WORLD BANK ATLAS 1985*

▇ 3 percent and more

UNITED ARAB EMIRATES
KUWAIT
MOZAMBIQUE
SAUDI ARABIA
OMAN
IVORY COAST
LIBYA
KENYA
NICARAGUA
IRAO
VENEZUELA
SYRIA
LIBERIA
HONDURAS
RWANDA
ZIMBABWE
TANZANIA
ZAMBIA
SUDAN
NIGER
MALAWI
IRAN
GUATEMALA
CONGO
CAMEROON
ALGERIA
ZAIRE
YEMEN S.
PAKISTAN
EL SALVADOR

▨ 2 to 3 percent

MONGOLIA
MEXICO
GHANA
DOMINICAN REP.
SOUTH AFRICA
SOMALIA
PHILIPPINES
BENIN
VIETNAM
UGANDA
SENEGAL
NEPAL
NAMIBIA
MALI
MADAGASCAR
TOGO
NIGERIA
MOROCCO
HONG KONG
EGYPT
ECUADOR
BOLIVIA
AFGHANISTAN
PARAGUAY
KOREA N
JORDAN
COSTA RICA
ANGOLA
TUNISIA
THAILAND
PERU
MALAYSIA
LESOTHO
BANGLADESH
ALBANIA
YEMEN N
PANAMA
MAURITANIA
ISRAEL
INDONESIA
INDIA
CENTRAL AFRICAN REP.
BRAZIL
TURKEY
BURMA
BHUTAN
SIERRA LEONE
PAPUA NEW GUINEA
LAOS
GUINEA
BURUNDI
BURKINA FASO
CHAD

░ 1 to 2 percent

ETHIOPIA
COLOMBIA
HAITI
SRI LANKA
KOREA S.
CHILE
JAMAICA
IRELAND
SINGAPORE
AUSTRALIA
ARGENTINA
CHINA
CANADA
GREECE
UNITED STATES
SPAIN
JAPAN

☐ Less than 1 percent

YUGOSLAVIA
U.S.S.R.
ROMANIA
POLAND
PUERTO RICO
PORTUGAL
NEW ZEALAND
CUBA
NETHERLANDS
CZECHOSLOVAKIA
URUGUAY
NORWAY
ITALY
FRANCE
BULGARIA
TRINIDAD AND TOBAGO
SWEDEN
HUNGARY
FINLAND
DENMARK
BELGIUM
AUSTRIA
UNITED KINGDOM
SWITZERLAND
GERMANY W.
GERMANY E.
LEBANON

BERNARD BENNELL/The Globe and Mail

By the year 2050, the world's population is expected to be about 14 billion — three times its present size. China with more than one billion people, and once a symbol of rampant population expansion, now grows at the rate of 1.2 per cent a year, the same as Canada. India, with three-quarters as many people, is expanding at 2.3 per cent a year, and should overtake China as population leader by the middle of next century. By heavy emphasis on family planning (and expelling many migrant workers) East and West Germany and Switzerland cut populations a little each year. For other reasons, Lebanon's population dips .3 per cent a year.

G&M 27 Jan86

1985 World Population Data Sheet of the Population Reference Bureau, Inc.

2213 M STREET, N.W.
WASHINGTON, D.C. 20037
(202) 785-4664

Prepared by Mary Mederios Kent and Carl Haub,
Demographers,
Population Reference Bureau

Founded in 1929, the PRB is now in its 56th year of gathering, interpreting, and disseminating information on the facts and implications of national and world population trends. A private, nonprofit organization, it is supported by grants and contracts, individual and corporate contributions, memberships, and sales of publications. It provides technical assistance to public and private groups in the United States and abroad, issues the publications listed below, and operates information and library services. The PRB also assists the development of population education through formal and nonformal programs.

PRB publications* include:

Population Bulletin
In-depth reports by recognized authorities on trends, problems, and policies in population and related fields.

Population Today
12-page newsmonthly [illegible] population-related news from around [illegible]

Interchange
Population education newslet[illegible]mpanied by ready-to-use classroom materials.

Special Publications
Population Handbook, a guide to basic demographic concepts, available in English, French, Spanish, Arabic, and an International Edition in English; *Data Sheets* on the world's women, youth, and children (forthcoming in 1985); and special publications for policymakers: *Population Trends and Public Policy* seri[illegible] 4-[illegible]ge *Executive Briefings* of selected popul[illegible] [illegible]*etin Policy Supplements*.

The United States Population Data Sheet
A wallchart, modelled on the *World Population Data Sheet*, presenting data on population and other topics for each state and the District of Columbia.

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Region or Country[1]	Population Estimate mid-1985 (millions)[2]	Crude Birth Rate[3]	Crude Death Rate[3]	Natural Increase (annual, %)[4]	Population "Doubling Time" in Years (at current rate)[5]	Population Projected to 2000 (millions)[6]	Population Projected to 2020 (millions)[6]	Infant Mortality Rate[7]	Total Fertility Rate[8]	%Population Under Age 15/Over Age 64[9]	Life Expectancy at Birth (years)[10]	Urban Population (%)[11]	Per Capita GNP, 1983 (US$)[12]	Total Area (1000's of sq. miles)/Percent Cultivated[13]
WORLD	4,845	27	11	1.7	41	6,135	7,760	81	3.7	35/6	62	41	$2,760	51,720/11
MORE DEVELOPED	1,174	15	9	0.6	118	1,271	1,351	18	2.0	23/12	73	72	9,380	21,344/12
LESS DEVELOPED	3,671	31	11	2.0	34	4,863	6,409	90	4.2	39/4	58	31	700	30,375/10
LESS DEVELOPED (Excl. China)	2,629	36	12	2.4	29	3,666	5,121	101	5.0	41/4	56	34	880	26,670/10
AFRICA	551	45	16	2.9	24	869	1,433	110	6.3	45/3	50	31	750	11,711/6
NORTHERN AFRICA	128	41	12	2.9	24	190	282	97	6.0	43/4	56	42	1,190	3,291/4
Algeria	22.2	45	12	3.3	21	35.5	53.5	109	7.0	46/4	60	52	2,400	919.6/3
Egypt	48.3	37	10	2.7	26	67.3	94.2	80	5.3	40/4	57	44	700	386.7/2
Libya	4.0	46	11	3.5	20	6.7	11.5	92	7.2	46/2	58	64	7,500	679.4/1
Morocco	24.3	41	12	2.9	24	37.5	58.8	99	5.9	46/3	58	42	750	172.4/19
Sudan	21.8	46	17	2.9	24	33.2	51.3	118	6.6	45/3	48	21	400	967.5/5
Tunisia	7.2	33	10	2.3	30	9.7	12.9	85	4.9	40/4	61	52	1,290	63.2/31
WESTERN AFRICA	166	48	18	3.0	23	272	454	118	6.4	47/3	48	29	580	2,372/10
Benin	4.0	51	23	2.8	25	6.3	10.9	149	7.0	49/5	43	39	290	43.5/16
Burkina Faso (Upper Volta)	6.9	48	22	2.6	27	10.5	17.7	149	6.5	44/3	44	8	180	105.9/10
Cape Verde	0.3	36	9	2.7	26	0.4	0.5	77	4.5	31/4	57	20	360	1.6/10
Gambia	0.8	49	29	2.0	35	1.0	1.6	193	6.4	43/3	35	21	290	4.4/14
Ghana	14.3	47	15	3.2	22	22.9	36.5	107	6.5	46/3	52	40	320	92.1/12
Guinea	6.1	47	23	2.4	29	8.9	14.3	147	6.2	43/3	40	22	300	94.9/6
Guinea-Bissau	0.9	41	22	1.9	36	1.2	1.8	143	5.4	44/5	43	27	180	13.9/8
Ivory Coast	10.1	46	18	2.8	25	16.0	29.0	122	6.7	45/3	47	42	720	124.5/12
Liberia	2.2	46	15	3.1	22	3.7	6.9	112	6.7	47/3	49	39	470	43.0/3
Mali	7.7	49	21	2.8	25	11.4	19.2	137	6.7	46/3	42	18	150	478.8/2
Mauritania	1.9	50	21	2.9	24	3.0	5.3	137	6.9	46/3	44	35	440	398.0/z
Niger	6.5	51	23	2.8	25	10.5	18.4	140	7.1	47/3	43	16	240	489.2/3
Nigeria	91.2	48	17	3.1	22	156.5	258.0	105	6.3	48/2	50	28	760	356.7/33
Senegal	6.7	50	19	3.1	22	10.5	17.9	141	7.1	45/3	43	42	440	75.7/27
Sierra Leone	3.6	47	30	1.7	41	4.9	7.3	200	6.1	41/3	34	28	380	27.7/25
Togo	3.0	45	17	2.8	25	4.7	8.3	113	6.1	44/3	49	20	280	21.9/25
EASTERN AFRICA	159	48	17	3.1	23	258	452	109	6.8	47/3	49	17	300	2,454/7
Burundi	4.6	48	21	2.7	26	7.0	10.4	137	6.4	44/3	44	7	240	10.7/47
Comoros	0.5	46	16	3.0	23	0.7	1.0	88	6.3	46/3	50	19	—	0.8/42
Djibouti	0.3	46	20	2.6	27	0.4	0.7	122	6.8	45/3	47	74	—	8.5/0
Ethiopia	36.0	43	22	2.1	33	54.8	88.5	142	6.7	45/3	43	15	140	471.8/11
Kenya	20.2	54	13	4.1	17	37.3	68.0	82	8.0	52/2	53	16	340	225.0/4
Madagascar	10.0	45	17	2.8	25	15.6	26.8	67	6.4	44/3	50	22	290	226.7/5
Malawi	7.1	52	20	3.2	22	11.4	20.5	165	6.9	48/2	45	12	210	45.7/20
Mauritius	1.0	21	7	1.5	47	1.3	1.6	26.9	2.7	33/4	67	43	1,150	0.7/58
Mozambique	13.9	45	17	2.8	25	21.4	36.0	110	6.1	46/5	49	13	—	309.5/4
Reunion	0.5	23	6	1.7	42	0.7	0.8	14	2.6	33/5	66	41	3,710	1.0/22
Rwanda	6.3	53	17	3.6	19	10.7	20.3	110	7.3	46/3	49	5	270	10.2/39
Seychelles	0.1	26	7	1.9	37	0.1	0.1	14.4	4.1	37/7	70	37	2,400	0.1/21
Somalia	6.5	47	21	2.6	27	9.1	14.1	143	6.5	44/4	43	34	250	246.2/2
Tanzania	21.7	50	15	3.5	20	37.3	70.7	98	7.1	46/4	50	14	240	364.9/6
Uganda	14.7	50	15	3.5	20	24.5	43.7	94	6.9	48/2	52	14	220	91.1/25
Zambia	6.8	48	15	3.3	21	10.9	20.7	101	6.8	47/3	51	43	580	290.6/7
Zimbabwe	8.6	47	12	3.5	20	14.5	28.1	70	6.6	48/3	56	24	740	150.8/7
MIDDLE AFRICA	62	45	18	2.7	26	95	163	119	6.1	44/3	48	34	420	2,553/4
Angola	7.9	47	22	2.5	28	12.0	20.2	149	6.4	45/3	42	24	—	481.4/3
Cameroon	9.7	44	18	2.6	27	14.4	23.1	117	6.5	43/4	48	42	800	183.6/15
Central African Republic	2.7	46	22	2.4	29	3.9	6.3	143	5.9	43/4	43	41	280	240.5/3
Chad	5.2	44	23	2.1	33	7.6	12.4	143	5.9	42/4	43	22	—	495.8/2
Congo	1.7	44	19	2.5	28	2.6	4.5	124	6.0	44/3	47	48	1,230	132.0/2
Equatorial Guinea	0.3	43	21	2.2	32	0.4	0.6	137	5.7	41/4	44	60	—	10.8/8
Gabon	1.0	35	18	1.7	41	1.6	2.8	112	4.7	36/6	49	41	4,250	103.3/2
Sao Tome and Principe	0.1	39	10	2.9	24	0.1	0.1	69.2	5.4	38/6	65	32	310	0.4/38
Zaire	33.1	45	16	2.9	24	52.4	93.3	106	6.1	45/3	50	34	160	905.6/3
SOUTHERN AFRICA	37	36	14	2.2	31	53	82	94	5.2	39/4	53	52	2,280	1,040/6
Botswana	1.1	50	13	3.7	19	1.8	3.5	79	6.6	50/2	54	16	920	231.8/2
Lesotho	1.5	42	16	2.6	27	2.3	3.7	110	5.8	42/4	49	6	470	11.7/10
Namibia	1.1	45	17	2.8	25	1.7	2.8	115	5.9	44/3	48	51	1,760	318.3/1
South Africa	32.5	35	14	2.1	33	46.5	70.1	92	5.1	38/4	54	56	2,450	471.4/11
Swaziland	0.6	48	17	3.1	22	1.0	1.8	129	6.5	46/3	47	26	890	6.7/8
ASIA	2,829	28	10	1.8	39	3,562	4,340	87	3.7	37/4	60	27	940	10,659/17
ASIA (Excl. China)	1,787	33	12	2.2	32	2,365	3,052	103	4.6	39/4	57	31	1,360	6,954/20
SOUTHWEST ASIA	114	39	11	2.8	25	171	253	94	5.9	42/4	61	53	3,500	1,754/10
Bahrain	0.4	32	5	2.7	26	0.7	1.0	37	4.6	33/2	67	81	10,360	0.2/3
Cyprus	0.7	21	9	1.2	57	0.7	0.9	17	2.5	25/10	74	53	3,720	3.6/47
Gaza	0.5	46	8	3.8	18	0.7	0.9	109	6.8	48/3	55	90	—	0.1/45
Iraq	15.5	46	13	3.3	21	24.9	39.3	72	6.7	49/4	59	68	—	167.9/13
Israel	4.2	24	6	1.8	39	5.2	6.6	14.2	3.1	33/9	74	87	5,360	8.0/20
Jordan	3.6	46	8	3.8	18	6.6	12.3	63	7.4	51/3	64	60	1,710	37.7/4
Kuwait	1.9	35	3	3.2	22	3.1	4.7	22.8	6.2	40/1	71	90	18,180	6.9/z
Lebanon	2.6	29	9	2.1	34	3.5	5.1	48	3.8	38/5	65	76	—	4.0/29
Oman	1.2	47	16	3.1	22	1.9	3.0	122	7.1	44/3	50	7	6,240	82.0/z
Qatar	0.3	31	3	2.8	25	0.5	0.7	45	6.8	33/2	71	86	21,170	4.2/z
Saudi Arabia	11.2	42	12	3.0	23	18.9	30.6	103	7.2	43/3	56	70	12,180	830.0/1
Syria	10.6	47	7	3.9	18	18.1	29.5	57	7.3	47/4	64	47	1,680	71.5/31
Turkey	52.1	35	10	2.5	28	71.3	97.0	110	5.1	39/5	63	45	1,230	301.4/35
United Arab Emirates	1.3	27	4	2.3	30	1.9	2.5	45	5.9	26/2	71	81	21,340	32.3/z
Yemen, North	6.1	48	21	2.7	26	9.1	14.0	154	6.8	49/3	44	15	510	75.3/14
Yemen, South	2.1	48	19	2.9	24	3.3	5.2	138	6.9	49/4	47	37	510	128.6/1
MIDDLE SOUTH ASIA	1,058	37	13	2.3	30	1,412	1,834	120	5.0	41/3	52	24	260	2,620/33
Afghanistan	14.7	48	23	2.5	28	24.3	34.2	205	6.9	45/4	37	16	—	250.0/12
Bangladesh	101.5	45	17	2.8	25	146.2	206.6	133	6.4	47/3	48	15	130	55.6/63
Bhutan	1.4	38	18	2.0	35	1.9	2.5	144	5.5	40/3	46	5	—	18.1/2
India	762.2	34	13	2.2	32	990.6	1,245.6	118	4.5	39/3	53	23	260	1,269.3/52
Iran	45.1	41	10	3.0	23	65.5	90.8	101	5.6	43/4	60	50	—	636.3/8
Maldives	0.2	43	13	3.0	23	0.3	0.4	108	6.5	45/2	52	20	—	0.1/10
Nepal	17.0	42	18	2.4	29	23.7	33.0	144	6.3	41/3	46	6	170	54.4/17
Pakistan	99.2	43	15	2.7	25	139.0	195.7	120	6.4	44/3	50	29	390	310.4/25
Sri Lanka	16.4	27	6	2.1	33	20.8	25.4	34.4	3.7	35/4	68	22	330	25.3/33
SOUTHEAST ASIA	404	32	10	2.2	31	542	702	79	4.5	40/3	59	24	710	1,735/17
Brunei	0.2	28	4	2.4	29	0.3	0.4	15	4.4	38/3	71	64	21,140	2.2/2
Burma	36.9	37	15	2.2	32	51.6	72.2	94	5.3	42/4	55	24	180	261.2/15
Democratic Kampuchea	6.2	32	11	2.1	33	8.4	10.2	160	4.7	33/3	43	16	—	69.9/17
East Timor	0.7	48	23	2.5	28	0.9	1.1	183	5.8	35/3	40	12	—	5.7/5
Indonesia	168.4	34	12	2.2	32	226.9	293.2	87	4.4	41/3	55	22	560	735.4/10
Laos	3.8	41	18	2.3	30	5.3	7.5	122	6.0	43/3	44	16	—	91.4/4
Malaysia	15.7	29	7	2.2	32	20.7	26.1	29	4.0	37/4	67	32	1,870	127.3/13
Philippines	56.8	32	7	2.5	28	77.7	101.5	50	4.8	43/3	64	37	760	115.8/39
Singapore	2.6	16	5	1.1	64	3.0	3.2	9.4	1.7	25/5	71	100	6,620	0.2/10
Thailand	52.7	25	6	1.9	36	67.6	85.0	51	3.9	38/3	63	17	810	198.5/37
Vietnam	60.5	34	9	2.5	28	79.5	102.2	90	4.7	41/4	66	19	—	127.2/19
EAST ASIA	1,252	18	8	1.1	65	1,437	1,550	35	2.1	32/5	66	29	1,360	4,551/10
China	1,042.0	19	8	1.1	65	1,197.0	1,288.0	38	2.1	34/5	65	21	290	3,705.4/11
Hong Kong	5.5	15	5	1.0	67	6.7	7.6	9.9	2.0	24/7	76	92	6,000	0.4/8
Japan	120.8	13	6	0.6	110	128.1	127.2	6.2	1.8	22/10	77	76	10 100	143.7/13
Korea, North	20.1	31	7	2.3	30	27.3	35.8	32	4.0	38/4	65	64	—	46.5/19
Korea, South	42.7	23	6	1.7	41	51.7	59.4	29	2.6	32/4	66	57	2,010	38.0/22
Macao	0.3	25	7	1.8	38	0.4	0.5	38	3.8	31/5	68	97	2,560	z/0
Mongolia	1.9	34	7	2.7	26	2.7	3.7	50	4.8	41/3	65	51	—	604.2/1
Taiwan	19.2	21	5	1.6	44	23.4	28.0	8.9	2.3	31/5	73	71	—	12.5/25
NORTH AMERICA	264	15	8	0.7	99	297	330	10	1.8	22/12	75	74	13,890	7,599/12
Canada	25.4	15	7	0.8	90	29.4	33.1	9.1	1.7	22/10	75	76	12 000	3,851.8/5
United States	238.9	16	9	0.7	100	268.0	296.6	10.5	1.8	22/12	75	74	14 090	3,615.1/20
LATIN AMERICA	406	31	8	2.3	30	554	752	62	4.2	38/5	65	66	$1,890	7,935/9
MIDDLE AMERICA	105	33	6	2.7	26	151	211	55	4.9	43/4	65	63	1,940	963/12
Belize	0.2	32	7	2.5	28	0.2	0.3	27	4.5	44/4	70	50	1,140	8.9/2
Costa Rica	2.6	31	4	2.7	26	3.6	4.8	19.3	3.5	37/4	73	48	1,020	19.6/13
El Salvador	5.1	28	6	2.1	33	7.8	12.4	42.2	5.6	45/3	65	39	710	8.1/34
Guatemala	8.0	43	8	3.5	20	12.2	19.7	62.4	6.1	46/3	59	39	1,120	42.0/16
Honduras	4.4	44	10	3.4	20	7.1	12.2	82	6.5	47/3	60	37	670	43.3/16
Mexico	79.7	32	6	2.6	27	112.8	150.7	53	4.7	42/4	66	70	2,240	761.6/12
Nicaragua	3.0	44	10	3.4	20	4.9	7.8	76	5.9	47/3	60	53	900	50.2/10
Panama	2.0	25	5	2.0	34	2.7	3.5	26	3.5	38/4	71	49	2,070	29.8/8
CARIBBEAN	31	25	8	1.8	39	39	51	55	3.3	35/6	67	54	—	92/26
Antigua and Barbuda	0.1	15	5	1.0	67	0.1	0.1	11.1	2.4	28/6	66	34	1,730	0.2/18
Bahamas	0.2	24	5	1.9	37	0.3	0.3	24.7	2.5	38/4	69	65	4,060	5.4/1
Barbados	0.3	18	8	1.0	72	0.3	0.3	14.2	2.0	28/10	71	42	3,930	0.2/77
Cuba	10.1	17	6	1.1	64	11.6	13.1	16.8	1.8	29/8	73	70	—	44.2/28
Dominica	0.1	22	5	1.7	40	0.1	0.1	12.6	3.4	41/6	65	—	970	0.3/23
Dominican Republic	6.2	33	8	2.5	28	8.4	11.5	64	4.1	41/3	63	52	1,380	18.8/30
Grenada	0.1	25	7	1.8	39	0.1	0.2	15.4	2.9	36/6	71	—	990	0.1/41
Guadeloupe	0.3	20	7	1.4	51	0.4	0.4	23	2.6	31/7	70	46	—	0.7/22
Haiti	5.8	38	13	2.3	30	8.4	14.1	108	5.5	44/3	53	28	320	10.7/32
Jamaica	2.3	28	6	2.2	32	2.8	3.5	28	3.4	37/6	70	54	1 300	4.2/24
Martinique	0.3	18	7	1.1	62	0.3	0.4	20	2.4	28/8	71	71	4.270	0.4/17
Netherlands Antilles	0.3	19	6	1.3	53	0.3	0.4	26	2.9	33/5	71	86	—	0.4/8
Puerto Rico	3.3	20	6	1.3	52	3.8	4.7	16.0	2.7	32/8	73	67	2.890	3.4/15
St. Kitts-Nevis	0.04	29	11	1.8	39	0.05	0.05	42.8	3.6	37/10	64	45	820	0.1/0
Saint Lucia	0.1	31	6	2.5	28	0.1	0.2	26.1	4.2	50/5	69	40	1,060	0.2/27
St. Vincent and the Grenadines	0.1	26	6	2.0	35	0.1	0.2	46.8	4.0	44/5	65	—	860	0.1/50
Trinidad and Tobago	1.2	25	7	1.9	37	1.5	1.7	28	2.9	34/6	70	23	6,900	2.0/31
TROPICAL SOUTH AMERICA	225	32	8	2.4	29	308	422	70	4.2	38/4	63	66	1,860	5,446/7
Bolivia	6.2	42	16	2.7	26	9.5	17.0	124	6.3	44/3	51	46	510	424.2/3
Brazil	138.4	31	8	2.3	30	187.1	251.3	71	4.0	37/4	63	68	1.890	3.286.5/9
Colombia	29.4	28	7	2.1	33	39.0	50.6	53	3.6	37/4	64	67	1.410	439.7/5
Ecuador	8.9	35	8	2.7	26	13.2	20.0	70	5.0	42/4	64	45	1.430	109.5/9
Guyana	0.8	28	6	2.2	31	0.9	1.2	35	3.3	37/4	68	32	520	83.0/2
Paraguay	3.6	35	7	2.8	25	5.3	7.8	45	4.9	42/4	65	39	1,410	157.0/5
Peru	19.5	35	10	2.5	28	27.7	38.3	99	5.2	41/4	59	65	1,040	496.2/3
Suriname	0.4	28	8	2.0	34	0.5	0.6	31	4.1	43/5	69	66	3.520	63.0/z
Venezuela	17.3	33	6	2.7	25	24.7	35.4	39	4.1	41/3	69	76	4,100	352.1/4
TEMPERATE SOUTH AMERICA	46	24	8	1.6	44	56	67	32	3.1	30/8	70	83	2,020	1,433/12
Argentina	30.6	24	8	1.6	44	37.2	45.6	35.3	3.4	30/8	70	83	2,030	1,068.3/13
Chile	12.0	24	6	1.8	39	14.9	18.1	23.6	2.6	32/6	70	83	1,870	292.3/7
Uruguay	3.0	18	9	0.9	77	3.4	3.8	33.2	2.8	27/11	69	84	2,490	68.0/8
EUROPE	492	13	10	0.3	240	509	507	15	1.8	22/13	73	73	8,200	1,881/29
NORTHERN EUROPE	83	13	11	0.1	465	84	83	9	1.8	21/15	74	75	9,680	608/11
Denmark	5.1	10	11	-0.1	—	5.0	4.6	8.2	1.4	20/15	74	83	11,490	16.6/62
Finland	4.9	14	9	0.5	154	5.0	4.9	6.0	1.7	20/12	74	60	10,440	130.1/7
Iceland	0.2	19	7	1.2	60	0.3	0.3	7.1	2.2	27/10	77	89	10,270	39.8/z
Ireland	3.6	19	9	1.0	71	4.3	5.8	10.5	3.0	31/11	73	56	4,810	27.1/14
Norway	4.2	12	10	0.2	365	4.2	4.1	7.8	1.7	21/15	76	71	13,820	125.2/3
Sweden	8.3	11	11	0.0	6,930	7.9	7.4	7.0	1.6	19/16	76	83	12,400	173.7/7
United Kingdom	56.4	13	12	0.1	630	57.0	55.9	10.1	1.8	20/15	73	76	9,050	94.5/29
WESTERN EUROPE	155	12	11	0.1	729	154	144	10	1.6	20/14	74	83	10,870	383/30
Austria	7.5	12	12	0.0	—	7.5	7.3	12.0	1.6	20/15	73	55	9,210	32.4/19
Belgium	9.9	12	11	0.1	1,155	9.8	9.2	11.3	1.6	20/14	73	95	9,160	11.7/25
France	55.0	14	10	0.4	198	56.8	57.5	9.0	1.8	22/13	75	73	10,390	211.2/34
Germany, West	61.0	10	11	-0.2	—	58.4	49.9	10.1	1.3	17/15	74	94	11,420	96.0/30
Luxembourg	0.4	12	11	0.0	3,465	0.4	0.3	11.2	1.6	19/13	72	78	12,190	1.0/—
Netherlands	14.5	12	8	0.4	192	14.7	14.0	8.4	1.5	22/12	76	88	9.910	14.4/23
Switzerland	6.5	11	9	0.2	330	6.4	5.9	7.7	1.6	19/14	76	58	16.390	15.9/10
EASTERN EUROPE	112	16	11	0.5	140	120	127	19	2.1	24/11	71	62	—	382/45
Bulgaria	8.9	14	11	0.2	315	9.4	9.3	16.8	2.0	22/12	72	65	—	42.8/37
Czechoslovakia	15.5	15	12	0.3	248	16.5	17.3	15.6	2.1	25/11	71	74	—	49.4/40
Germany, East	16.7	14	13	0.1	990	16.9	16.8	10.7	1.8	19/15	72	77	—	41.8/46
Hungary	10.7	12	14	-0.2	—	10.9	10.5	19.0	1.8	22/13	70	54	2,150	35.9/57
Poland	37.3	20	10	1.0	68	41.1	44.9	19.3	2.4	25/10	71	59	—	120.7/47
Romania	22.8	15	10	0.5	131	25.6	28.5	28.0	2.2	27/10	71	49	—	91.7/44
SOUTHERN EUROPE	143	13	9	0.4	165	151	153	18	1.9	24/12	73	69	4,810	508/37
Albania	3.0	28	6	2.2	32	4.0	5.3	43	3.6	35/5	71	34	—	11.1/25
Greece	10.1	14	9	0.5	154	10.9	11.6	14.9	2.1	22/13	74	70	3,970	50.9/30
Italy	57.4	11	10	0.1	990	57.8	54.8	12.4	1.6	21/14	74	72	6,350	116.3/41
Malta	0.4	15	8	0.7	103	0.4	0.4	14.1	2.1	24/9	72	85	3,710	0.1/44
Portugal	10.3	14	9	0.5	136	11.1	12.1	19.8	2.0	26/11	71	30	2.190	35.6/39
Spain	38.5	13	7	0.6	116	41.7	43.4	9.6	2.0	26/11	74	91	4.800	194.9/41
Yugoslavia	23.1	17	10	0.7	99	24.6	25.0	31.7	2.1	24/9	70	46	2,570	98.8/31
USSR	278	20	10	1.0	71	316	364	32	2.4	25/10	69	64	6,350[a]	8,649/10
OCEANIA	24	21	8	1.2	56	28	32	39	2.7	29/8	71	71	8,570	3,286/6
Australia	15.8	16	7	0.9	82	17.2	18.4	10.3	1.9	25/10	75	86	10,780	2,967.9/6
Fiji	0.7	31	6	2.5	28	0.8	0.9	28.8	3.6	37/3	62	37	1,790	7.1/13
French Polynesia	0.2	32	6	2.6	27	0.2	0.3	23	3.9	46/2	62	57	8,190	1.5/19
New Caledonia	0.2	25	6	2.0	35	0.2	0.2	11	3.6	36/4	64	61	7,790	7.4/1
New Zealand	3.3	16	8	0.8	90	3.6	4.0	12.5	1.9	27/10	74	83	7,410	103.7/2
Papua-New Guinea	3.3	40	14	2.7	26	4.6	6.4	98	6.0	44/4	53	13	790	178.3/1
Samoa, Western	0.2	34	8	2.7	26	0.2	0.3	49	4.9	40/5	65	22	—	1.1/43
Solomon Islands	0.3	43	12	3.2	22	0.4	0.7	86	7.2	48/3	57	9	640	11.0/2
Vanuatu	0.1	40	13	2.8	25	0.2	0.3	98	6.0	45/2	54	18	—	5.7/6
	Pop. 1985	Birth Rate	Death Rate	Nat. Inc.	Doub. Time	Pop. 2000	Pop. 2020	Inf. Mort.	TFR	<15/>64	Life Expect.	% Urban	GNP p.c.	Area

Acknowledgements

The Population Reference Bureau gratefully acknowledges the cooperation and assistance of the Center for International Research, U.S. Bureau of the Census, the Population Division and Statistical Office of the United Nations, the Food and Agriculture Organization of the United Nations, and the World Bank in the preparation of this year's *Data Sheet*. The PRB assumes responsibility for all figures shown. PRB staff members Janine Adams and Keiko Osaki gave valuable assistance in many stages of the *Data Sheet's* preparation.

General Notes

World Population Data Sheets of various years **should not be used as a time series.** Because every attempt is made to use the most recent and reliable information available, fluctuations from year to year often reflect improved or revised estimates based on new data sources or studies rather than actual changes in levels. This is particularly true of countries in the less developed regions for which statistics are often computed from incomplete data and assumptions derived from demographic models.

Regional and World totals: Population totals include small areas not listed separately: regional data have been independently rounded and may not equal the sum of their parts; regional and world rates and percentages are weighted averages of those countries for which the data are available. Regional totals are not computed where figures are available for less than seventy-five percent of the population. A dash (—) is printed where no reasonable estimate is available. z indicates that a statistic rounds to zero.

Sources of data and estimates: Unless otherwise cited, basic data used come primarily from the following sources: United Nations (UN): *Demographic Yearbook, Population and Vital Statistics Report* of the UN Statistical Office; *Demographic Indicators of Countries: Estimates and Projections as Assessed in 1982* (forthcoming), and *World Population 1983 and 1984* (forthcoming) of the U.S. Bureau of the Census. Other sources include the World Bank estimates and projections, country reports of the World Fertility Survey, official country publications, special studies, and direct communication with demographers and statisticians in the U.S. and abroad. Specific data sources may be obtained from PRB.

Footnotes

[1] The *Data Sheet* lists all geopolitical entities with a population larger than 150,000 and all members of the United Nations. Classification of "more developed" and "less developed" regions follows UN practice, whereby "more developed" regions comprise all of Europe and North America, plus Australia, Japan, New Zealand, and the USSR. All other regions and/or countries are classified as "less developed."

[2] Based upon data from a recent census or by incorporating estimates made by the UN, the U.S. Bureau of the Census, and official country publications.

[3] Annual number of births or deaths per 1,000 population. For more developed countries (MDCs) with complete registration of vital events, nearly all rates refer to 1982 or 1983. For LDCs, most of whom lack complete registration systems, estimates refer to some point in the early 1980s. "Crude" rates, particularly the crude death rate, can be affected by a population's age composition: thus, the higher death rates for MDCs are a reflection of the larger proportion of the older population in those countries (which is in turn caused by lower birth rates in MDCs).

[4] Birth rate minus death rate. since the rates were based on the unrounded birth and death rate, they do not always exactly equal the difference between the rates shown on the Data Sheet.

[5] Based on the current *unrounded* rate of natural increase (RNI). This column is provided to give some indication of the potential effect of different levels of the RNI and is *not intended* to forecast the actual doubling of any population. The columns on projected populations in 2000 and 2020 should be consulted for the change in population size actually anticipated under a reasonable set of assumptions regarding future birth and death rates.

[6] For most countries, projected by applying growth rates incorporated in projections prepared by the UN, the World Bank, or the U.S. Bureau of the Census. For countries with low fertility (a total fertility rate of 2.0 or less), PRB projections incorporating an assumption of constant fertility were used. Projections to 2020 are, of course, subject to particularly wide margins of error.

[7] Annual number of deaths to infants under one year of age per 1,000 live births in a given year. For countries with complete or nearly complete registration as considered by the UN, nearly all data refer to 1982 or 1983 and are from the UN Statistical Office, *Population and Vital Statistics Report, Data Available as of 1 January 1985* (forthcoming) or official country publications; these rates are shown to one decimal place. For countries with incomplete data, estimated rates are generally from the late 1970s to early 1980s and are from the UN *Demographic Indicators*. . . , projections of the World Bank, official country data, or special studies.

[8] The total fertility rate (TFR) indicates the average number of children that would be born to each woman if each were to live through her childbearing lifetime (usually considered ages 15-49) bearing children at the same rate as women of those ages actually did in a given year. A TFR of 2.1 to 2.5, depending upon mortality conditions, indicates "replacement level" fertility: the level at which a country's population would eventually stop growing (or declining), assuming no net migration. Most TFRs shown here refer to the 1980-1985 period for less developed countries and are from the UN Population Division's *1982 Assessment*. . . or survey estimates such as those of the World Fertility Survey. For more developed countries, rates are the latest officially reported as shown in the source noted above or from Alain Monnier, *L'Europe et les pays développés d'outre-mer. Données statistiques, Population*, 39:4/5, Institut national d'études démographiques, Paris, 1984, and refer to 1980-1983.

[9] The percentages of the population under age 15 and over age 64, i.e., in the "dependent" ages, indicate the economic burden which must be carried by those in the working ages, 15 to 64. Those under 15 also constitute the future population which must be absorbed into the labor market at the same time it begins to contribute to population growth by forming new families. These figures are taken from the UN *Demographic Indicators*. . . , the *Demographic Yearbook, 1983* (forthcoming), and official country data.

[10] Average years an infant can be expected to live under current mortality conditions. Estimates are primarily those of the UN Population Division or the *Demographic Yearbook* and refer to the late 1970s or early 1980s.

[11] Percentage of total population living in areas termed urban by that country. Estimates refer to some point in the 1970s or early 1980s.

[12] Gross National Product per capita figures are provisional estimates from the *World Bank Atlas, 1985.* (a) GNP per capita estimate for the USSR refers to 1982 and is from the *World Factbook, 1984*, the National Technical Information Service.

[13] Data for total area and for "cultivated" land are from the *Production Yearbook, 1983* of the UN Food and Agriculture Organization (FAO). As shown on the *Data Sheet*, cultivated land uses the FAO category "arable land and land under permanent crops." This FAO definition includes land used for seasonal crops (double-cropped areas counted once), land temporarily fallow, and that used for permanent crops such as rubber trees. Countries vary widely in the availability of land reserves for expansion of agricultural zones. Some areas may possess good opportunities for such expansion while others may be subject to serious economic and ecological constraints. At present, large areas of Africa are classified as fallow rather than "arable" due to shifting cultivation. Data for Taiwan are from the *Statistical Yearbook of the Republic of China, 1982.* (Note: 1 square mile = 2.59 sq. kilometers)

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A Commentary on:

"THE LIMITS TO GROWTH"

(D. Meadows, et al)

This book was published in 1972 in the midst of economic trends that were engendering widespread fears of unbridled inflation, of uncontolled growth, monopoly economics, world scale cartels, manipulated scarcities, and limited visible supplies of some commodities. The book was an immediate sensation. It was in that same era that OPEC siezed the petroleum market; the predatory Hunt Brothers of the U.S. tried to corner the silver market; Brazil capitalized on frost damage to its coffee crop, and so on. It was a period of frenzied mercantilism on a world scale; of unbalanced foreign trading, global carpet-bagging, that culminated in nearly a trillion dollars of unsound credit to Third World countries, and even greater accumulations of unstable domestic debt - all in support of what seemed to be a permanent pattern of profitable growth.

The Limits of Growth appeared to be a scholarly study, computer-based, by prestigious authors and sponsors. In reality it was a prime example of that common affliction of theoretical futurologists that I term "extrapolitis simplex". This is a mental reflex which takes a trend - most any trend - population, mineral production, commodity markets, whatever - and projects that trend, narrowly focussed, into the future. Frequently, as here, it is done on a global scale, which qualifies it for the term: "globaloney". In the end, of course, physical circumstances determine the actual course of events, and eventually put the lie to many such forecasts.

This book made a significant contribution to the 'scarcity psychosis' of the 1970s. A favorite example of this phenomenon, one of many, is that of the panic-buying of toilet paper in Japan, reported in the press. Paper products, especially low quality toilet paper, are products that cannot conceivably be curtailed or forced into short supply by shortages of the essential component - vegetable fibre. But the time was ripe for such mindless reactions by the consuming public.

The Limits of Growth had some favorable, if superficial, reviews in the popular press, and was widely recommended. But some of the more analytical reviews wrote it off as "a computerized forecast of doom" of doubtful validity. One such review in the New York Times read:

> "The author's press agents describe the book as a 'rediscovery
> "of the laws of nature through the medium of the computer'...In
> "our view, (this book) is an empty and misleading work. Its
> "imposing apparatus of computer technology and systems jargon
> "conceals a kind of intellectual Rube Goldberg device -- one
> which takes arbitrary assumptions, shakes them up and comes out
> "with arbitrary conclusions that have the ring of science. (It)
> "pretends to a degree of certainty so exaggerated as to obscure
> "the few modest (and unoriginal) insights that it genuinely contains.
> "Less than pseudo-science and little more than polemical
> "fiction, "The Limits of Growth" is best summarized not as a rediscovery
> "of the laws of nature but as a redicscovery of the
> "oldest maxim of computer science: Garbage In, Garbage Out."
> "(Peter Passell, Marc Roberts, and Leonard Ross; N. Y. Times
> "Book Review, p.1, Ap 2 '72 800w.)

Other analytical reviews also contributed to the 'de-bunking' of the book. Excerpts from some of these are appended.

Now in the 1980s it can be more readily seen that the 'global' view adopted by the authors is more of an ideological fantasy than an economic reality. The growth rates that Meadows and team used and extended are no longer valid - overwhelmed by the international credit collapse of 1981 and the imperatives of national survival that followed.

The Meadows team (and the book) examined five basic factors which, they said: "determine, and therefore ultimately limit, growth on this planet--population, agricultural production, natural resources, industrial production and pollution". The inadequacy of these parameters and of the treatment of them are discussed in the critical comments of the several reviewers quoted in the attachments to this paper.

But neither the research team of Limits of Growth nor its critics saw fit to consider the one factor which, above all others, intervened to invalidate Meadows' analysis and forecasts: the debt factor. (Technocrats especially will understand and appreciate this element, as it vindicates the analysis and projections of Technocracy.)

Debt creation (credit expansion, if you prefer the other side of the coin) is an essential mechanism in modern economic expansion, at least in the western capitalist countries. Fed by compound interest, it inevitably runs ahead of physical growth, to become the de-stabilizing influence leading to ultimate collapse. It was so in 1929 and again in 1981. Thus the global catastrophe projected by Meadows et al, for the next century has been superceded by events in the real world of the 1980s. The international collapse of 1981 has resulted in a withering of the world trade structure; scarcities have become gluts; shortages have become surpluses; inflation has abated. National economic survival has become the primary concern.

It must be added, in fairness, that the book is not without merit. It brings our attention to the virtues of conservation, cleaning up pollution, encouraging birth control, etc. (Many other contemporary books do this too.) But it is also very misleading and must accept its share of responsibility for the 'scarcity psychosis' of the '70s, and a pessimistic view of the potential of science and technology. It is, above all, the quintessential expression of 'globaloney' and should be recognized as such.

17 Jan 86

Walter R. Fryers.
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Attachments: Excerpts from reviews of: The Limits to Growth. 4 pp.

EXERPTS FROM REVIEWS OF: "THE LIMITS OF GROWTH" (in chronological order)

11 Mar 72 - THE ECONOMIST

"As usual with such reports, it advocates that mankind should stop the growth of capital investment as well as of world population, because a computer has said that the highest possible standard of living that this planet can afford is one that stagnates at half today's North American level, and that it should be shared equally among a stabilized world population living for an average of 70 years."

"The report represents the highwater mark of an old-fashioned nonsense, because the MIT team has pumped into its computer so many dear, dead assumptions. It falls with both eyes open into the central trap before all futurologists, and is thus in danger of discrediting the germ of truth that should make more considered researchs of this sort worth while...The central trap is that...your computer tells you that you are heading for a breakdown if you tell it to assume continuance of the effect without continuance of the cause."

"Is there any value in this sort of exercise when it can apparently lead such very clever people into such misconceptions?"

31 March, 1972 - NEW STATESMAN

"Basically, it is a non-technical account of results obtained from a simulation model of the world developed by Professor Jay Forrester at MIT."

"Forester himself has moved on to pastures new - perhaps even to model the universe - and it has been left to his lackeys, led by Dennis Meadows, to refine and expand the master's original world model. This they now claim to have done, and The Limits to Growth is the result."

"With social systems, there is no way of being certain that the relationships in a model are correct."

"...we cannot place too much reliance on the predictions of Forrester-type models, and it is unfortunate that this is exactly what seems to be happening with The Limits to Growth."

""Meadows and his team assure us that the model has been refined and developed, but, in their headlong 197-page gallup through global problems, omit to specify how this has been done. It is all sadly reminiscent of Emerson's maxim: if you're skating on thin ice, it's best to go quickly."

Spring 1972 - LIVING WILDERNESS

"There seems to be no new information concerning the world model. No comparisons appear to have been made between real world data and the model, and there is nothing to suggest that the model has been refined on the

basis of additional research. In fact, this book is a step backwards, in that the model upon which it is based is available only through an as yet unpublished technical report."

"Although the authors are scientists who use large digital computers, The Limits to Growth cannot be considered a scientific work. The book does not adequately describe the new world model, its assumptions and limitations."

29 April, 1972 - NEW REPUBLIC

"...natural resources are not something fixed, but are a function of human knowledge, which is expanding into a very large niche of the collective human nervous system."

"Computer models can do no more than spell out the implications of their own assumptions. The explicit assumptions of the present volume, however, are going to be revealed later and it is certainly a weakness of the study that they were not at least put into an appendix where they could be judged openly. The famous GIGO principle (Garbage In, Garbage Out) applies as much to these projections as it does to any other computer process."

"Naive growthmanship supposes that the poor three-quarters of the world can get as rich as the rich quarter by following the same patterns of economic growth...the Club's model does not involve any analysis of even a two-part world."

22 May, 1972 - THE NATION

"Since 1798, when Malthus first recorded his ingenious observations on geometric versus arithmetic series, the nature of exponential growth rates has fascinated social scientists. Exponential growth is the clown of mathematics; it is the Sunday supplement math puzzle: the man who grows rich by investing a penny at 10 per cent compounded continuously; the Persian courtier who, by bargaining with the king for one grain of rice on the first square of the chessboard, two on the second, four on the third, sixteen on the fourth, and so on, winds up with the whole kingdom's harvest. Exponential growth rates exist in nature as parts of complex systems. When social models attempt to divorce growth principles from the systems that bind them, there is a danger that exponential growth will cease to be a tool and revert to its role as clown. This is, unfortunately, sometimes the case with this otherwise excellent new book...Distribution, production and the political structure that bounds them, are not and cannot be independent...In the Meadows study, mechanisms of income distribution are political and social variables taken as outside of the model; they are independent, assumed to be fixed and given...This is the point at which the model's shortcomings become clear."

"...the question I have posed is qualitative, rather than quantitative. It assumes changes in institutions, rather than in physical quantities... The Limits to Growth, then, attempts to analyze qualitative problems as if they were quantitative."

"It would be wise, I think, to approach Meadows' recommendations (if they can be called that) with some caution. They are rather mechanical and naive."

June, 1972 - AMERICAN FORESTS

"There appears little significant distinction between the Club's conclusions, computerized, systems analyszed, and jargon-dressed, and the one-man one-typewriter approach of such comparative loners as Fairfield Osborn (The Limits of the Earth), Harrison Brown (The Next 100 years), and Barry Commoner (The Closing Circle). Give and take figures here and there and the specific phrasing of conclusions that are, at best, mere guestimates, you find virtually the same conclusions."

"(For all of its sophistication, the Club of Rome falls victim time and again to the weakness in us all for linear thinking...)."

"There is general agreement throughout society's informed leadership of the critical problems that scream for resolution. But no one tells us how the miracle is to be wrought....There seems to be nowhere the wit or will to grasp the dilemma and wrestle it to victory...".

August, 1972 - AMERICAN CITY & COUNTY

"...(this book), the work of a prestigious group of scientists carrying the name of the Club of Rome, has been joyfully embraced by the more literate of society as further "proof" that technology is forcing us to total and inevitable doom. Many of our more articulate people are somewhat like the religious cults of the past who prophesied confidently and morbidly that the end of the world was imminent."

"If you read the book carefully, instead of superficially, you will discover that the scientists themselves have reservations about the answers that their computers are producing. Computers really are in their infancy, and, contrary to popular belief, they do not always tell the truth. They cannot correct a misstatement fed into them, nor can they analyze data that have not been supplied to them. The scientists recognize that many factors may not have been given sufficient weight. Technology can advance and make changes; new resources can be developed."

"...they frequently refer to "exponential growth", but rarely name the exponent. We submit that there is none. A common phrase is that --"if the present trend continues". But trends always have changed, and probably always will."

January, 1974 - ENCOUNTER

"...was it a scientific study? The answer obviously depends on what you understand by the term "scientific";...there is one very disturbing aspect of The Limits to Growth story and that is the fact that no detailed

information about the underlying model was given in the original publication. And what is more, the Technical Report containing this information has still not been published. In other words the scientific community has been denied the data necessary to make a critical examination of the assumptions and structure of the model--except at the whim of Professor Meadows. This is a curious way for scientists to behave--especially in a controversial subject-area which they believe to be of earth-shattering importance."

"Finally, are the Meadows predictions likely to be accurate? From what I have seen of the crudity and naivety of the model's assumptions, I doubt it very much....we are obliged to be very sceptical when they tell us to expect global eco-catastrophe in 2020 A.D. To say this is simply to paraphrase the consensus of the scientific debate about The Limits to Growth. It is not an original or indeed even an interesting statement...".

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Distribution List of A Commentary on The Limits Of Growth

1.	CHQ.	17 Jan 86
2.	John Gregory	✓ ✓ ✓
3.	Howard Rennick	✓ ✓ ✓
4.	Bonnie Gebhardt	✓ ✓ ✓
5.	Ron Morgan.	✓ ✓ ✓
6.	Technocracy Digest	✓ ✓ ✓
7.	NW Technocrat	✓ ✓ ✓
8.	John Taube	✓ ✓ ✓
9.	Jim Davidson	✓ ✓ ✓
10.	Val Newcombe.	26 Jan 86.

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17 Jan 86

To the Reader:

This paper was written primarily for the attention of members of Technocracy. Although 'Technocracy' is predicated upon the capacity of modern science and technology to produce an abundance of use forms and services, the 'scarcity psychosis' engendered by this and other similar books did infect, to one degree or another, many members and officers of the organization. The result was a blurring of the distinction between a Technocracy, which is a design for the distribution of abundance, and a Price System, which is the mechanism for the differential distribution of scarcity. This confusion was most intense in the 1970s. Now in the 1980s the basic problem is becoming more apparent: it is not one of supply, but one of distribution. It is important that members of Technocracy keep this clearly in mind.

Walt Fryers.

Ref.: A Commentary on: The Limits to Growth.

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Edmonton, Alta.
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17 Jan 86

To the Reader:

This paper was written primarily for the attention of members of Technocracy. Although 'Technocracy' is predicated upon the capacity of modern science and technology to produce an abundance of use forms and services, the 'scarcity psychosis' engendered by this and other similar books did infect, to one degree or another, many members and officers of the organization. The result was a blurring of the distinction between a Technocracy, which is a design for the distribution of abundance, and a Price System, which is the mechanism for the differential distribution of scarcity. This confusion was most intense in the 1970s. Now in the 1980s the basic problem is becoming more apparent: it is not one of supply, but one of distribution. It is important that members of Technocracy keep this clearly in mind.

Walt Fryers.

Ref.: A Commentary on: The Limits to Growth.

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531638
The Limits To Growth
? MEADOWS, Donella H
Reviewed in : Saturday Review v55 p65 Apr 22 1972

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531637
The Limits To Growth Main 1941+ 015.73 PUB
MEADOWS, Donella H
Reviewed in : Publishers Weekly v202 p52 Sep 4 1972

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The Limits To Growth 1940+ 051 NEW
? MEADOWS, Donella H
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531635
The Limits To Growth ~~British 052 NAT~~
? MEADOWS, Donella H US: 051 NAT (1912+)
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531634
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MEADOWS, Donella H
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531633
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? MEADOWS, Donella H
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The Limits To Growth 574.973 LIV 1962 to 1982
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MEADOWS, Donella H 052 ECO 1955+
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? MEADOWS, Donella H
Reviewed in : Choice v10 p1424 Nov 1973

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531624
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531623
The Limits To Growth 634.905 AME
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Reviewed in : American Forests v78 p42 Jun 1972

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531622
The Limits To Growth 352.07305 AME
MEADOWS, Donella H 1975-79 only
Reviewed in : American City and County v87 p37 Aug 1972
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DATAPAC: 6050 0123
131104150004802


DATAPAC: call connected to 1 3110 4150004802
         (293) (i, n, remote charging, packet size: 128)


all dialog ports are in use
please try dialnet, tymnet or uninet

DATAPAC: call cleared - remote request(293)


DATAPAC: 6050 0123
1 3106009


DATAPAC: call cleared - temporary network problem(000)


DATAPAC: 6050 0123
1 3106900803,ki


DATAPAC: call connected to 1 3106 900803
         (29D) (i, n, remote charging, packet size: 128)

DIALOG INFORMATION SERVICES
PLEASE LOGON:
?[redacted]
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Welcome to DIALOG

Dialog version 2, level 6.8.9
LOGON File001 05nov85 17:50:30
**
DIALOG News (Enter ?NEWS for details):
************************************************************
DIALMAIL Electronic mail is now available.  See ?DIALMAIL.
************************************************************
DIALOG Version 2 now available an additional 15 hours
eek!  See ?NE<?b 137

       05nov85 17:50:46 User000990
    $0.10     0.004 Hrs File1
    $0.04  Tymnet
    $0.14  Estimated cost this file
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File 137:BOOK REVIEW INDEX - 1969-85/AUG

      Set  Items  Description
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?ss limits(w)groewt

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      S1     629  LIMITS
      S2    1801  GROWTH?
      S3      44  LIMITS(W1)GROWTH?
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Ref    Items  Index-term
E1         4  AU=MEADOWCROFT, ENID
E2         1  AU=MEADOWES, ALICIA
E3         0 *AU=MEADOWS
E4        39  AU=MEADOWS, A J
E5         1  AU=MEADOWS, CECIL A
E6         9  AU=MEADOWS, DENNIS L
E7         2  AU=MEADOWS, DONELLA
E8        17  AU=MEADOWS, DONELLA H
E9         4  AU=MEADOWS, EDDIE S
E10        8  AU=MEADOWS, EDWARD
E11        1  AU=MEADOWS, FERGUSON B, JR.
E12        1  AU=MEADOWS, H

          Enter P or E for more
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                 9  AU=MEADOWS, DENNIS L
                 2  AU=MEADOWS, DONELLA
                17  AU=MEADOWS, DONELLA H
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                44  S3
      S5        17  S4 AND S3
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MEADOWS, A. J. Science and controversy; a biography of Sir Norman Lockyer. 331p pl $16.95 '72 MIT press

B or 92 Lockyer, Sir Joseph Norman
ISBN 0-262-13-079-3 LC 72-4536

This is an account of the life and scientific career of Sir Norman Lockyer who was the founder and editor of Nature magazine and who "developed a spectroscopic method for studying solar prominences in daylight, discovered helium, proposed that the atom was not an immutable entity, studied the astronomical orientation of Stonehenge and Egyptian temples, and more." (Sat R) Annotated chapter bibliographies. Index.

Choice 10:481 My '73 180w

Reviewed by R. L. Hough
Library J 98:734 Mr 1 '73 120w

"[Meadows] has written a competent, nit-picking book which carefully traces its hero's progress from one detailed astronomical controversy to the next with a loving care that Mr Theodore White might well envy. If you're passionately interested in the doings of the Council of the Royal Astronomical Society in the 1870s look no further; otherwise read on." John Naughton
New Statesman 84:60 Jl 14 '72 300w

"[This biography] is interesting chiefly for its portrait of the sheer activity of scientific discussion in nineteenth-century England. Lockyer emerges as something of a prototype of the earnest Victorian, rushing from public service to private study with an unflagging energy—interrupted by occasional breakdowns from overwork. . . . [Lockyer's career] should make fairly interesting reading but does not. . . . The book does manage to simplify some of the scientific material for lay readers, but its style seems to approximate that of Lockyer's lesser contemporaries and as a whole is almost impenetrable in its plodding dullness."
Sat R 55:68 D 23 '72 210w

"One could wish that the book were better written—it takes the author a chapter or two to strike a good relaxed style. . . . The general development is not strictly chronological, which makes reference a little difficult, especially as the index heads are rather general, but Meadows has whole armies of eminent Victorians to marshal and his is probably the best choice of expository technique. . . . What makes the book absorbing is the character of its subject. . . . Meadows does Lockyer and us a great service in describing the vivid personality of his subject and the immense variety of his concerns in science and public life. As a vignette of intellectual life in Victorian London, the book is outstanding." D. S. Evans
Science 179:556 F 9 '73 1300w

"Confronted by [a] mass of material for a biography, Professor Meadows has meticulously put it in order, duly added his references, and generally left behind one of those granite Victorian monuments which will not be easily eroded. His portrait is honest. Lockyer was, like Huxley, a born controversialist, but was as often wrong as he was right. . . . Meadows points out, in his preface, there was a great breadth to Lockyer's interests, as there was to Huxley's. But he also suggests that this gives us a measure of Lockyer's stature, which it certainly does not."
TLS p1302 N 3 '72 650w

MEADOWS, DONELLA H., ed. The limits to growth; a report for The club of Rome's project on the predicament of mankind. 207p $6.50; pa $2.75 '72 Universe bks.

330.9 Population. Pollution. Food supply
LC 73-187907

The message of this book is that "either civilization or growth must end, and soon. Continued population and industrial growth will exhaust the world's minerals and bathe the biosphere in fatal levels of pollution. As the authors summarize, 'if the present growth trends . . . continue unchanged, the limits of growth on this planet will be reached sometime within the next hundred years. . . . [This work] is a product of an interdisciplinary M.I.T. team . . . financed and publicized . . . [by] the Club of Rome . . . a four-year-old international organization of 75 technocrats and businessmen." (N Y Times Bk R) Bibliography.

Reviewed by P. J. Henriot
America 126:636 Je 17 '72 350w

"The ethical and moral implications here are tremendous. Pope Paul has repeatedly warned the aggressive producing nations—the United States, USSR, Japan—that their production style is already endangering the survival of the underdeveloped nations, and all such grinding eventually hurts all of the world. In all, both the Pope and this new recommendation say somewhat the same thing—redistribute more fairly or we all suffer. This new group also adds the stigma of overproduction as dysfunctional. This will not be acceptable to the leading nations, but it is definitely something for the rest of the world to think seriously about." Brother Benedict Wengler
Best Sell 32:17 Ap 1 '72 380w

"[This] is a computerized forecast of doom. It is going to be talked about a great deal—more talked about than read, most likely—precisely because it is computerized; while predictions of doom are common these days, one that comes out of a computer is more impressive than most. Since this forecast takes an extremely pessimistic view of the future and recommends corresponding extreme actions to head off universal catastrophe, it is getting close attention inside government and out. . . . The reader cannot help but find the book's tone of calm certainly irritating. . . . It would be foolish to ignore the book because it forces us to face an unpleasant future. The Club of Rome obviously had apocalyptic intentions that are unlikely to be fulfilled; but the book may well sharpen our sense of urgency about the future, and that, however modest an accomplishment, is something." Edward Edelson
Book World p13 Mr 26 '72 1300w
Choice 10:1424 N '73 180w

Reviewed by S. D. Antler
Nation 214:666 My 22 '72 2000w

Reviewed by K. E. Boulding
New Repub 166:27 Ap 29 '72 1700w

Reviewed by John Naughton
New Statesman 83:427 Mr 31 '72 850w

"The author's press agents describe the book as a 'rediscovery of the laws of nature' through the medium of the computer. . . . In our view, [this book] is an empty and misleading work. Its imposing apparatus of computer technology and systems jargon conceals a kind of intellectual Rube Goldberg device—one which takes arbitrary assumptions, shakes them up and comes out with arbitrary conclusions that have the ring of science. [It] pretends to a degree of certainty so exaggerated as to obscure the few modest (and unoriginal) insights that it genuinely contains. Less than pseudoscience and little more than polemical fiction, 'The Limits of Growth' is best summarized not as a rediscovery of the laws of nature but as a rediscovery of the oldest maxim of computer science: Garbage In, Garbage Out." Peter Passell, Marc Roberts and Leonard Ross
N Y Times Bk R p1 Ap 2 '72 [illegible]00w

"This important work is a response to a crucial question: What will happen if current economic and demographic trends continue? Beginning with Malthus, many men have examined the issue of exponential growth in a finite system; none, however, have done so in such an empirical and systematic fashion as have the authors of The Limits to Growth. . . . Response to [this] study varies from those who agree with the work's principal thrust, as I do, to those who reject it out of hand as a doomsday prophecy. The findings of The Limits of Growth are not comforting—but then neither are the circumstances in which we find ourselves in the late twentieth century." L. R. Brown
Sat R 55:65 Ap 22 '72 2800w

MEAGHER, ROBERT E., ed. Toothing stones: rethinking the political. 289p $7.95 '72 Swallow press

301.5 U.S.—Politics and government—1945- .
U.S.—Social conditions
ISBN 0-8040-0566-4 LC 75-189197

"Meagher has drawn together a series of essays dealing with the question of individual participation in political life in America today. The contributors include Allard K. Lowenstein, Elinor B. Bachrach, Joseph M. Duffy, and others. They consider the present state of individual engagement in politics and speculate as to whether 'serious long term engagement is already passé.' They explore the possibilities of whether too little is expected from public life and too much expected from private life, emphasize the value of participation in political activity, and indicate the necessity of such participation for the public good." (Library J)

"So much 'pale, ire, envy, and despair' in this anthology. The early essays given an annoyingly caterwauling tone to the whole book which requires more of a pacifier than a Machiavellian 'toothing stone.' Balance, continuity, and organization are none too present. . . . There are several very relevant and very readable contributions including William Arrowsmith's 'The reformed university,' and D. S.

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Limits to misconception

How seriously should we all take the forecast from the Club of Rome of impending world doom?

Four years ago an idealistic Italian industrialist interested in ecology tried to recruit up to 100 world savants into a well-financed project, whose main object turned out to be to sponsor the sorts of computer model through which one school of academics at the Massachusetts Institute of Technology has long been forecasting the doom of the world. Rather fewer internationally known scholars joined this Club of Rome than publicity about it has sometimes claimed. But some have done, and the result is that a lot of otherwise sensible people are suspecting this week that there must be something in the first MIT project commissioned by the club.* As usual with such reports, it advocates that mankind should stop the growth of capital investment as well as of world population, because a computer has said that the highest possible standard of living that this planet can afford is one that stagnates at half today's North American level, and that it should be shared equally among a stabilised world population living for an average of 70 years.

The report represents the highwater mark of an old-fashioned nonsense, because the MIT team has pumped into its computer so many dear, dead assumptions. It falls with both eyes open into the central trap before all futurologists, and is thus in danger of discrediting the germ of truth that should make more considered researches of this sort worth while.

The central trap is that, ever since economic growth really began with the industrial revolution 200 years ago, any scientist has always had to forecast world disaster if he plots existing exponential economic growth against the elasticities of supply and substitution for particular things as assumed within known technology. Since it is exponential growth in technology that is spurring exponential growth in income, of course your computer tells you that you are heading for breakdown if you tell it to assume continuance of the effect without continuance of the cause. As an example that has been quoted here before, in 1872 any scientist could have proved that 1972's quantum of urban transport and travel within London was impossible (and therefore a city the size of London was impossible), because where were Londoners going to stable all the horses and how could they avoid being asphyxiated by the manure ?

On the other hand, the germ of common sense behind researches like the Club of Rome's is the suspicion that today's pace of exponential growth in gross world product must run into inelasticities of supply in some particular things some time. For the past 25 years many people have been trying to forecast what they would be, but getting them wrong.

About 20-25 years ago the imminent inelasticities were supposed to come in food and raw materials, so that eminent scientists were asserting that world famine was certain before 1970 (we were going to create a lot of dustbowls) and the Paley report in America said that raw materials would rise steadily in price compared with prices of finished goods. Instead, the industrial countries have piled up butter mountains, and the terms of trade turned sharply against raw materials in the year of the Paley report itself, because the elasticity of supply and substitutability for many foods and raw materials has actually been increasing rather fast. Later in the 1950s many people thought that the worst inelasticity would come in our power to get rid of growing pollution from our air and water ; but even crude legislation like Britain's Clean Air Act of 1956 has worked surprisingly well, so that the smoke content of London's air has been reduced by three-quarters in 15 years and fish have appeared under some central London bridges for the first time in 100 years. Certainly, we should watch for any turnround ; but bottlenecks appear where elasticities of supply are declining near to nought, and it is not logical to forecast that the first ones will appear where extra effort has recently brought forth greater results than originally expected (ie, where elasticities of supply are rising).

The trendy ignore the trends

By the late 1950s many people (including this newspaper) had switched into thinking that the really lasting inelasticity might be in the provision of education to underdeveloped countries (because the supply of adequate teachers willing to go, or able to be trained, there is so limited) ; but computer-assisted learning programmes now already promise a real future breakthrough there. By the mid-1960s, the main inelasticity appeared to be in the supply of decent urban living systems (this was not only because high-rise housing is proving a nasty way of living, but because a lot of urban public services, ranging from police protection to garbage collection, appeared to be breaking down) ; there is still reason to be worried about this, although the signs are better than they were. Probably the main worry at the moment lies in the breakdown of various social patterns, and in a possibily emerging inelasticity of supply of the unknown satisfactions that could keep them reasonably cohesive.

There would be great advantage if the Club of Rome sponsored computer research into suggesting what are the things now coming into inelastic supply. Instead, the MIT team has done the opposite. Its computer model assumes artificial inelasticities in the supply of the three things—food, raw materials, pollution control—that were wrongly thought to be inelastic 20-25 years ago. This is always the easy and popular thing to do, because there

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* "The Limits to Growth," a report for the Club of Rome's Project on the Predicament of Mankind, Potomac Associates, 205 pages. $2.75.

are naturally lots of distinguished people around who wrongly made these forecasts then and long to agree that they were not wrong after all. In addition, food scientists, pollution experts, etc, naturally think that food science, pollution control, etc, are the most important things in the world, and they can then be paraded as expert opinion to say how right the Club of Rome is to proclaim that much more attention should be concentrated on the fields in which they are experts and to which they have devoted their lives.

This report thus actually does more than fall into the usual trap of assuming present state-of-the-art elasticities of supply. It postulates eventual absolute inelasticities of supply in its three chosen causes of breakdown—food, raw materials, pollution control—by constantly proclaiming that " this is a finite world " (ie, a world in which supply of everything eventually becomes totally inelastic), and then draws charts in which the curve of exponentially rising demand crosses these straight lines showing absolute inelasticity during the next century. The absolute inelasticities are pulled forward to an earlier period than is commonsensical by the usual semantic muddle of assuming that the meaning of a word in today's technology will be the same in tomorrow's technology.

Arable is infinitely indefinable

Thus it predicts that the exponentially rising curve of demand for food (without defining what the word " food " might mean tomorrow) will cross an absolute limit set by " arable " land in our children's lifetimes (without recognising that the word " arable " is an existing-state-of-technology-word that is necessarily changing its meaning all the time). If we ever did find demand rising towards the club's supposed straight line—and at present, to repeat, the gap is widening rather than narrowing—then it is highly probable that the forces of market innovation would shift the line upward again by such relatively foreseeable new technologies as inventing new plants in pods, turning agriculture from its present incredibly inefficient reliance on unharnessed solar power, substituting present fish-hunting by sea farming, etc.

The limit for raw material production is luckily not set in this report by citing the old canard of " known world reserves," at a time when every oil drill pushed down into the North Sea finds oil reserves that nobody even 15 years ago had suspected, but the straight line that the doomsters need to be cut by their exponentially rising demand curve can still be readily manufactured by saying " assume that real world reserves are twice present known levels or five times them," and then pretending that this is optimistic. But in reality it is much more likely that we will for a time exponentially increase raw material reserves (depending on how you define both materials and reserves) in line with exponentially rising demand, because the coming breakthroughs to fusion and harnessed solar power as sources of energy should enable us to extract minerals from rocks and start to put matter together molecule by molecule. The assumption in the report that pollution will stop economic growth, even if supposed food and material shortages do not, is merely asserted, not scientifically assessed with any eye on possible new technologies (or even on recent legislative results).

Is there any value in this sort of exercise when it can apparently lead such very clever people into such misconceptions ? While it would be absurd artificially to slow down economic growth (which depends on growing technology) because you think that technology will not grow fast enough, population could well go on swelling inconveniently even if technology slows down. It is therefore useful to inspire new thinking now on population control, although the problem is probably not going to be the easy one which this report assumes—of spreading known technological aids like the pill to help voluntary birth control. The real problem is that in the next few decades we are probably going to learn how to cure a lot of degenerative diseases and thus how to keep too many old people alive ; incidentally, this report, while calling for population control, also thinks that the non-resource-using activity of medical research is one activity that we should increase—either most oddly, or because it knows that there is a scientific community of medical researchers that will applaud it for saying this. We should face the fact that total world population probably will outrun one of the real supply inelasticities—which are unlikely to be food, raw materials, or pollution control—and that some future generation may have to choose either to resort to compulsory rationing of births (especially as women in the future may be able to order the sort of babies they want by clonal reproduction in their own bodies), or to euthanasia, or to genetic engineering (if we were to turn ourselves into a race of six-inch men instead of six-feet men, most of the Club of Rome's problems would be solved). It does seem rather desirable to think out which we would prefer rather well in advance.

It would also be welcome if computer studies could be turned to trying to check what things are coming into inelastic supply. For goods and other satisfactions sold in the market the price system shows this, but for other goods and satisfactions (ranging from simple public services like sewage, through to more complicated satisfactions like social living patterns appealing to the younger generation) it does not.

The budget

The Chancellor of the Exchequer, Mr Barber, opens his budget box on Tuesday, March 21st, and there will be the usual full coverage of his proposals and their effect on industry, the market and the economy as a whole in *The Economist*. In next week's issue there will be pre-budget analysis of what the Chancellor is likely, and ought, to do. This week: a special assessment of what could be in store for investors (page 79) and comment on the latest advice to reach the Treasury (page 83).

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and exaggerated redress does not act as an unhealthy deterrent against boldness of utterance. The jury will not know, as the judge and the lawyers will know, that an excessive award may ruin the plaintiff, since it will almost inevitably be reversed by the Court of Appeal or ultimately by the House of Lords. In the result, the unhappy plaintiff may be far worse off with such an award than with a totally adverse verdict. But the law of damages is now in a mess. One of the last articles in the book is on the subject of punitive damages and the PQ17 libel case, which was published before the House of Lords ruled on the case to which it refers. The effect of that ruling does leave the law of damages in the most unsatisfactory situation that I can remember in a lifetime of practice.

Principles enunciated in a trade union case (Rookes *v* Barnard), which for practical purposes were repudiated as inappropriate by the Court of Appeal, have now been reinstated, but nevertheless still remain wholly inappropriate. The realistic matters for consideration in relation to reform are how to control the quantum of damages – if possible. I hope, with the retention of a jury; how to assimilate the law of slander into the law of libel; how to reduce the immense complexities of the pleadings in a libel action, and how to ensure that in these actions above all others the plaintiff can seek to vindicate his reputation without exposing himself to total financial ruin. One obvious and properly recommended reform is to allow legal aid to become available to a plaintiff under suitably regulated conditions.

But in a free society the law of libel must be available to be used – although as sparingly as can be humanly contrived – to redress the balance between the man who has no access to the media of communication and the people who can control these media in any fashion they think fit. No sane man would bring a libel action if he could avoid it. He should only do so if the allegation is one with which he cannot possibly live until it is refuted. The best cautionary tale in this book is the sad piece about Harold Laski. There never was an action from which he should have been more determinedly deterred. I have no doubt that his advisers sought to deter him, but equally great men are frequently obstinate. Yet the account does demonstrate how devastating the loss of such a piece of litigation can be to a sensitive man and the general unwisdom of bothering about what someone says on the hustings, even if published in the popular press.

I do not in this matter express any official view for the press. The press would be well satisfied with revisions to the law of damages that did not expose them to verdicts totally disproportionate to the injury. The responsible press recognises that the law of libel must remain as the last protection of an affronted citizen, and I do not believe there will be very wide clamour from the newspapers for several of the reforms recommended in this book. But the book gives the best survey of the problem that I have yet encountered. It is salutary reading and anyone with an interest in the subject would be recommended to its pages.

John Naughton

New Model Army

The Limits to Growth *by* D. H. MEADOWS, D. L. MEADOWS, J. RANDERS *and* W. W. BEHRENS III *Earth Island* £1.00

And now, as they say, for something completely different: a genuine, bona fide, computer model of the world, no less. It comes to us hot from the Massachusetts Institute of Technology with the enthusiastic, if somewhat ungrammatical, endorsement of a former president of Avis Rent A Car Inc.:

> If this book doesn't blow everybody's mind who can read without moving his lips, then the earth is kaput.

These multi-purpose transatlantic sentiments have been echoed here recently by Mr Anthony Tucker of the *Guardian. The Limits to Growth,* he tells us, belongs to that rare class, 'documents that may change the course of mankind' – a conveniently ambiguous phrase which could be applied with almost as much accuracy to the annual report of the White Fish Authority as to this latest computerised prophecy of doom. Not to be outdone, *The Times* recommended the book to Lord Rothschild as essential reading, thereby adding to that unfortunate man's already onerous duties, and Paul Ehrlich gave his usual benediction to the entire enterprise. With so many things going for it, *The Limits to Growth* seems set to make an impact on public opinion quite out of proportion to its intrinsic merits, for it is, in many ways, an overrated and frustrating little book.

Basically, it is a non-technical account of results obtained from a simulation model of the world developed by Professor Jay Forrester at MIT. The model is the natural outcome of a distinctive approach to the study of complex systems which has been associated with MIT's Sloan School of Management for nearly 15 years. In the early 1950s Forrester realised that simulation techniques developed for engineering systems were also applicable to industrial systems and this led to the publication, in 1961, of his famous book *Industrial Dynamics,* in which he outlined methods for constructing mathematical models of industrial firms. Since then Forrester has refined his techniques and applied them not only to firms, but also to the growth and decay of a city (*Urban Dynamics,* 1968), and to world resources (*World Dynamics,* 1971). Following the publication of this latter work, Forrester himself has moved on to pastures new – perhaps even to model the universe – and it has been left to his lackeys, led by Dennis Meadows, to refine and expand the master's original world model. This they now claim to have done, and *The Limits to Growth* is the result.

Much of the first part of the book is devoted to a neo-Malthusian exposition of exponential growth and its limits. Then the world model is briefly and unsatisfactorily described, and the results of what is grimly

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termed the 'standard' run – i.e., what the model predicts if present policies remain unchanged – are plotted. Then the effects of some alternative assumptions and strategies – such as imposing pollution controls and effective contraception – are examined. The main conclusion from all this is that, no matter what we do, we are heading for a crisis within the next 50 years which will eliminate most of us. Most of the control strategies tested do not avert disaster, but simply postpone it. Having mixed themselves this depressing brew, Meadows and his team recover their nerve and, in the final section of the book, concentrate on eliciting from their model the steps necessary to bring about the 'state of global equilibrium' which represents Nirvana for modern ecologists.

Judging by the response to date, many people are paying more attention to the sombre findings of *The Limits to Growth* than they have to previous doomsday forecasts. This is, I suppose, a measure of the extent to which society is becoming computer-ridden. But before anyone starts reaching in despair for the cyanide, and without wishing to sound as tetchily complacent as Mr John Maddox of *Nature* (who is still wondering what all the fuss is about), a certain amount of scepticism might be in order. A model is simply an ordered set of assumptions – usually formulated as mathematical relationships between various variables – about a complex system. The behaviour of any model is crucially dependent on the way these are formulated, and no model is better than its weakest assumption. With social systems, there is no way of being certain that the relationships in a model are correct. Faced with this, most model builders have been driven to use a battery of statistical techniques to ensure that their relationships are compatible – within stated probabilistic limits – with historical data.

The great weakness of Forrester's work is that he has always refused to do this, and has preferred to rely on *a priori* formulation of the relationships in his models. He justifies this by the assertion that the woeful inadequacy of the existing data on social systems makes it impossible to construct useful models which are also statistically reliable – which is true as far as it goes. But the other side of *that* particular coin is that we cannot place too much reliance on the predictions of Forrester-type models, and it is unfortunate that this is exactly what seems to be happening at present with *The Limits to Growth*.

But perhaps the most fundamental objection to this report by Professor Meadows and his team is that it is too skimpy by far. Forrester's original world model purported to explain the course of five main global variables – population, resources, pollution, capital and food – and a host of lesser variables in a mere 50 equations. Some of the assumptions underlying the model were dubious – one combination implied a life-expectancy of 178 years, for example. Meadows and his team assure us that the model has been refined and developed but, in their headlong 197-page gallop through global problems, omit to specify how this has been done. It is all sadly reminiscent of Emerson's maxim; if you're skating on thin ice, it's best to go quickly.

Christopher Price

The Elect

Graduates: The Sociology of an Elite *by* K. K. KELSALL, ANNE POOLE *and* ANNETTE KUHN *Methuen* £3.70

This book is a further attempt by Professor Kelsall and his associates at Sheffield to dissect the British university graduate. He carried out a unique survey to discover what 8,000 graduates who left university in 1960 were doing in 1966, and gave us his first conclusions two years ago in *Six Years After*. This second book takes a deeper, sociological look at them. The routine assertion that it is written for the general reader as well as the specialist is on this occasion not unreasonable. In spite of spasmodic retreats into the private language of the socio-academicians, the message comes across with some clarity.

It is a somewhat negative and rather depressing one. University graduates are tied as firmly to the iron laws of class and sex discrimination as anyone else. The idea of the British university as a crucible which eradicates the base metal from the undergraduates it receives, and sends them forth into the world unalloyed and equal, seems to have little to be said for it. The jobs which (especially male) graduates eventually end up in, are heavily influenced by the level of aspiration they have fixed on before they ever get to university. The real élite remains the top slice of graduates from the public schools and Oxbridge, who go on to senior administrative jobs in government and industry. For the working-class graduate, there is a strong tendency to opt for the secure womb of the teaching profession – with thoroughly paradoxical results:

> the most important single destiny of the educationally *successful* working-class child who has clearly overcome a number of earlier hurdles on the way to a university degree is, as a school teacher, to prepare the sons of the middle class for those very positions, to which, by virtue of his upbringing, he has by and large failed to obtain access.

One answer to all this is an obligation on the part of university appointments officers positively to awaken students to career possibilities, rather than simply doling ou the information they ask for. But havin made the suggestion, the authors then hav second thoughts; it might simply have th effect of indoctrinating a few more wor ing-class students with super-élite attitude Better, they say, to begin to educate th top professions into widening their horizon also.

The book is also concerned about wome By 1966, nearly half the graduate wome in the survey had dropped out of wor into motherhood, and this is constantl categorised as a 'waste of precious talent' The authors admit, however, that the phe omenon may be only temporary; the perio of six years between the two studies coul not have been better designed to catc the women graduates tied to the pram an the nappies. But they are still worried. Th trouble with graduate women, they feel, i that too many of them are not even inte ested in capitalising on their expensiv education. A few, from the very top draw er, set up their own businesses and see quite satisfied. A lot teach, but there i much evidence of job dissatisfaction amon them. But most of them are 'captives b choice'. They are 'decidedly familistic' Only 12 per cent of them expect the great est satisfaction in life to come from thei career. The assumption is that the Britis female, *qua* graduate, gets a very raw dea and they want her to snap out of it.

It will be interesting to see whether the still feel that way in 1980. The dust jack displays an academically-clad Oxford under graduate striding through the front quad rangle of the Queen's College to meet hi fate in the examination schools across th High Street. It reminded me of a strang ceremony in which I participated las Christmas at the very same college, wher I was invited, after a 20-year gap, to spen an evening with 200 vaguely familiar con temporaries in convivial consumption o some of the college's spare investment in come. Job satisfaction among that particu lar sample of the male graduate élit seemed to me to be at an all-time low. I should have thought that a varied life of some career, a little leisure and plent of satisfying childbirth is a far better proposition than the deskbound monotony to which so many husbands are enslaved. do not know whether Professor Kelsall in tends to pursue his sample into middle age if he does, I suspect he will find the com plaints of these graduate girls a good dea less shrill next time.

Roy Fuller

Outside the Supermarket

Grasping with opposite hand the side of his pram
As though an idle sceptre or marshal's baton,
A look of serious surveillance on his face,
This infant for an instant restores to me
The sense of mankind's worth.

No matter that soon he'll be in floods of tears:
Who can blame his frustration at a recalcitrant world?
Thus wept Isaiah over Jerusalem.
Long years must pass before like Caligula
He weeps for a single neck.

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The Limits to Growth

by

Donella H. Meadows
Dennis L. Meadows
Jorgen Randers
William W. Behrens III

A Report for The Club of Rome's Project on the Predicament of Mankind. A Potomac Associates Book. New York: Universe Books. 1972. Illustrated with diagrams, graphs. 205 pp. $6.50 (cloth); $2.75 (paper)

Reviewed by Eric A. Hirst and Stephen K. Schuck

THE Club of Rome is an informal international association of about 70 scientists, educators, economists, humanists, industrialists and civil servants concerned with the long-term fate of mankind. *The Limits to Growth*, written by a group of MIT researchers, is the second major report from the Club's "Project on the Predicament of Mankind." This project was designed to investigate some of the long-term (30 to 200 years) consequences of the numerous political, economic and social decisions currently being made throughout the world. An earlier work on this problem was Jay Forrester's *World Dynamics*, published in March, 1971 [reviewed in *The Living Wilderness*, Special Alaska Issue]. Forrester's book describes a simple computer program which evaluates a system of 45 equations for the time period 1900 to 2100. The key variables in the computer program are population, capital investment, natural resources, pollution and the fraction of capital devoted to agriculture. This "world model" contained shortcomings which Forrester hoped would be corrected by additional study sponsored by The Club of Rome. *The Limits to Growth* is the result of that additional study.

After a careful reading of *Limits* it appears that the considerable fanfare and enthusiasm which accompanied its publication was not justified for readers of *World Dynamics*. There seems to be no new information concerning the world model. No comparisons appear to have been made between real world data and the model, and there is nothing to suggest that the new model has been refined on the basis of additional research. In fact, this book is a step backwards, in that the model upon which it is based is available only through an as yet unpublished technical report.

However, for the popular audience which may not be familiar with the more technical *World Dynamics*, *Limits* is an interesting book and well worth reading. The book provides an excellent and readable discussion of historical growth patterns in population, food production, industrial output, natural resource consumption and pollution.

For example, the book describes the three factors which influence fertility (number of births per woman per year): (1) The maximum birth rate is the rate at which women would bear children if they practiced no birth control. (2) The desired birth rate is the rate at which women would have children if all their children were planned and wanted. This assumes that birth control methods are 100 percent effective. But these methods are not perfect, so (3) the birth control effectiveness factor is included.

These three factors are, in turn, determined by other variables. The maximum biological birth rate depends primarily on the general health of the population, which in turn is determined by adequacy of diet, medical care and sanitation practices. Birth control effectiveness depends partly on technology, partly on the social and political system, and very much on personal motivations and expectations. Desired birth rate depends, to some extent, on the economic condition of the people. Countries with high birth rates have low per capita income, and vice versa. Birth control effectiveness is much higher in wealthy countries than in poor nations and this, of course, affects birth rates.

The book notes that "the earth is finite" and that no amount of technological sleight-of-hand can change this fact. Thanks to technology we have so far been able to forestall the Malthusian dilemma, but we shall not be able to do so forever. Technological optimists, according to the book, are unrealistic, because new technologies often have unpleasant side effects. This is a direct consequence of the various couplings and feedback loops in the world system. The automobile is a classic example of a technology that is

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immensely beneficial but is also responsible for considerable environmental damage.

THE authors are not opposed to technological advances. In fact they feel that certain technological developments such as recycling, pollution control and contraceptives are "absolutely vital to the future of human society *if they are combined with deliberate checks on growth.*" The discussion in *Limits* is centered around exponential growth, a characteristic of populations, bank interest and capital investment. Exponential growth starts out slowly and then increases more and more rapidly. For example:

> Suppose you own a pond on which a water lily is growing. The lily plant doubles in size each day. If the lily were allowed to grow unchecked, it would completely cover the pond in 30 days, choking off the other forms of life in the water. For a long time the lily plant seems small, and so you decide not to worry about cutting it back until it covers half the pond. On what day will that be? On the twenty-ninth day, of course. You have one day to save your pond.

This fable illustrates the rapidity with which exponential growth engulfs a system as the limit is approached. To carry the example further, on the 26th day only 1/16 of the pond is covered with water lily. Thus it takes 87 percent of the total time period to cover 1/16 of the pond. It takes only the remaining 13 percent of the time period to cover the remaining 15/16 of the pond. Exponential growth is not perceived as a problem until the limit is closely approached; by then it may be too late!

The most interesting chapter of *The Limits to Growth* is the last one, "The State of Global Equilibrium." The three basic requirements of an equilibrium society are:

> 1. *The capital plant and the population are constant in size.* The capital investment rate equals the depreciation rate and the birth rate equals the death rate.
>
> 2. *All input and output rates—births, deaths, investment and depreciation—are kept to a minimum.*
>
> 3. *The levels of capital and population and the ratio of the two are set in accordance with the values of the society.* They may be deliberately revised and slowly adjusted as the advance of technology creates new options.

The equilibrium condition defined above is not necessarily one of stagnation. Changes can and would occur within the context of these three requirements; such changes would ensure a dynamic, rather than static, equilibrium. In fact, the most important human and social activities—education, art, music, religion, scientific research, athletics and social interactions could continue to grow.

Although the authors are scientists who use large digital computers, *The Limits to Growth* cannot be considered a scientific work. The book does not adequately describe the new world model, its assumptions and limitations. However, the book is a very readable treatise which shows how several important world processes tend to grow exponentially toward their limits in a finite world. Its suggestions for an equilibrium society make it important reading for people concerned with the long-term fate of mankind.

Dr Hirst's review of *World Dynamics*, by Jay W Forrester appeared in the Special Alaska Issue of this magazine An active member of the Environmental Action Council at Oak Ridge, Dr Hirst is a research engineer in the Oak Ridge National Laboratory National Science Foundation Environmental Program

Mr Schuck is a graduate student in the Industrial Engineering Department at Stanford University

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Yes, the Wolf is Real

The Limits to Growth by Donella H. Meadows, Dennis L. Meadows, Jorgen Randers and William W. Behrens III

(Universe Books; $6.50 hardbound, $2.75 paperback)

There is so much to turn people off in his volume, and in the enterprise which represents (described as "a report for he Club of Rome's project on the predicament of mankind") that the questions it raises, the importance of which an hardly be overestimated, may be in langer of a kind of psychological blackut. There is danger also on the other ide of developing a mystique of computerized prophecy which will encapulate itself in a sectarian movement nd will so fail to have the impact on ublic awareness it deserves.

When all the computer spaghetti has een discounted, the single overwhelmg message which emerges through is document is that earth is a finite iche, and, therefore, *any* indefinitely xpansionist process within it must ventually reach the limits of the niche elf. Development is not a joyful, unnited expansion into infinity; it is a rocess of filling a bottle, the bottle in is case being the planet earth. When e are filling a very large bottle, as we ve been doing, we may get an illuon that the process can go on forever; it at some point it begins to dawn on that the bottle is finite and, if we go filling it, eventually it will be full. is crisis of finitude, or crisis of cloe as it might be called, has been eaking up on the human race in the th century because of an enormous crease in the rate of filling the bottle. e first environmental excitement, or monition of closure, came in the ited States in the 1900s, associated th the name of a Governor Pinchot d Teddy Roosevelt. The present exement, in which we suddenly have a ong sense of finitude, has not been eved but accentuated by the space erprise. We have seen our own utiful blue and white planet and suddenly come to realize that it is only decent bit of real estate in a very long way. The astronauts discovered not new worlds for expansion but new deserts, more forbidding and costly to live in than any desert on earth.

The trouble with the doomsayers, however, and this has been the trouble with them for a long time, is that development is not a matter of filling a rigid bottle but an expansible one which expands as it is filled. The process is more like filling a rubber balloon than a bottle. Furthermore, natural resources are not something fixed, but are a function of human knowledge, which is expanding into a very large niche of the collective human nervous system. In the last 200 years we have almost certainly been increasing resources faster than we have been using them up. For a long time now the doomsayers have been disappointed and the wolf criers seem to have scared the wolves away. W. Stanley Jevons in the 1860s predicted the exhaustion of British coal resources in the 20th century, little dreaming of natural gas under the North Sea. Sir William Crooks in 1899 predicted mass starvation in the 20th century because of the exhaustion of Chilean nitrates, little dreaming of the Haber process developed in 1913 for the extraction of nitrogen from the air. Wolf crying, as the old story shows, is a dangerous business. It can easily destroy credibility, which is particularly dangerous when there is a real wolf somewhere in the forest. In this case, a real wolf there is that nobody can deny; his name is finitude, and his breath smells mighty bad. But though we hear him howling in the forest, we do not really know how far away he is.

Now the MIT computer comes along to tell us. The work derives from that of Jay Forrester of industrial dynamics fame, who is the high priest of computerized dynamic systems and a sworn foe of casually intuitive images of the

To The Rulers

We read and hear about you every day,
What you decide we need, or want, or may
Be made to stand still for. . . . Now let us pray.

Approaching the year One Thousand of Your Lord,
Men fixed that date for the ending of the world;
Truth and round numbers naturally in accord.

One of society's earlier ego trips,
That hinted only this to Your Lordships:
A calendar implies apocalypse.

That passed. And all the reborn skeptics smiled
Over such fancies as could have beguiled
No one who was not but a simple child.

Now, as we near the next millennium,
Reality's caught up with Kingdom Come—
Why wait two dozen years to round the sum?

O Conscript Fathers, sponsors of the draft,
Prospective survivors on the little raft
That when the world sinks will be what is left,

I hear you praying, as your fingers trill
Unnervingly at night beside the pill,
The button, the hot line to the Other Will,

Your prayer, that used to be Caligula's too,
If they all only had one neck . . . It's so
Unnecessary and out of date. We do.

HOWARD NEMEROV

future. That the future is frequently counterintuitive can be attested by anybody who has been surprised by it. On the other hand the systems represented in this volume could unkindly be called "under-the-counter-intuitive," on the grounds that they depend on parameters which are not revealed clearly to the reader but which also seem frequently to have been picked out of the air in a highly intuitive manner. Whether intuitive parameters are superior to intuitive futures, I am not sure. Computer models can do no more than spell out the implications of their own assumptions. The explicit assumptions of the present volume, however, are going to be revealed later and it is certainly a weakness of the study that they were not at least put into an appendix where they could be judged openly. The famous Gigo principle (garbage in, garbage out) applies as much to these projections as it does to any other computer process. Not that all these inputs of these models are garbage; some of them are highly plausible. Nevertheless we do need to know exactly what the inputs are and we need to know, what is a little harder with computer operations, exactly why the inputs produce the results they do. I did my statistics in the medieval times of hand-cranked computers, then called calculating machines, but I recall vividly my teacher, the late Henry Schultz of Chicago, commiserating with us on this arithmetical slavery and excusing it by saying, "Well, at least you got familiar with the data," which we certainly did. Now, of course, the computer gets familiar with the data, but the operator does not. This is one of the major external diseconomies of the computer era.

The system that is presented in this volume has 5 major variables: population, pollution, resources, industrial output per capita, and food per capita; all these on a world scale and without any consideration of regional differences. In all the models population rises until it is checked by something, either by resource exhaustion or by increase in pollution, food shortages, soil erosion, and so on. In all the models, also, population overshoots any conceivable long-run equilibrium, so that the peak is followed by a disastrous trough. Even in the most optimistic models, where population is rapidly stabilized and optimistic assumptions made about resources, pollution, and agricultural productivity, there is still an irreducible element in resource exhaustion, and we are in serious trouble before the end of the 21st century. In all the models doomsday occurs at some time in the 21st century, earlier on the pessimistic assumptions and not much later on the optimistic assumptions.

Make no mistake about it, there is a real wolf in these woods. A number of us have been proclaiming for many years the wolf's existence and we must be grateful to the Club of Rome for howling about it in a more dramatic, and, one hopes, more convincing way than the rest of us wolf-criers have been able to do. Nevertheless, there is still a danger that this is not the right wolf. What is missing from all these models is man himself, especially his learning capacity, his adaptability and the extraordinary, large niche of his central nervous system. Almost the only source for optimism in the present situation is the fact that the capacity of the human nervous system seems far from having been exhausted. It is doubtful whether we use more than around 10 percent of it. The human nervous system is also a niche and has limits, but we are still a very long way from the biological boundaries which eventually will limit the human learning process. A development by no means off the human agenda in the next 50 or 100 years would be the development of an explicit understanding of the learning process, which would turn education from the craft industry which it now is, where there has been very little development for two or three thousand years, into an operation that could expand very rapidly the complexity and realism of man's own image of himself and his environment, and render all present predictions obsolete. It would upset every parameter in the social system, and something even far short of this but in the same direction might easily be enough to kill the wolf and permit us to make a transition into a reasonably agreeable spaceship earth.

While I am prepared to send out for a wolf-tamer and would not wish the reader to go away with the sense of unrelieved gloom, nevertheless, in all honesty I must confess that there are a lot more wolves than the lone wolf howling in this volume. The very global nature of the model prevents an examination of the structural problems on the planet and especially the division of the world into rich areas and poor. Naive growthmanship supposes that the poor three-quarters of the world can get as rich as the rich quarter by following the same patterns of economic growth. The wolf of the Club of Rome throws grave doubts on this naive optimism; yet the Club's model does not involve any analysis of even a two-part world. One is tempted to call the two worlds Romulus and Remus; Romulus is Rome, which stands for the rich Temperate Zone; Remus is the poor twin of the tropical world, coming late to the feast, for whom there may simply not be enough milk. There is, indeed, a nightmarish scenario in which Romulus, secure behind his technology and his weaponry, simply pushes Remus over the cliff. There is an even worse scenario in which Romulus tries to help Remus by sharing the milk with him, with the result that they both perish. Here is a counter-intuitive system straight out of Malthus and the English classical economists, that any help given to the poor merely serves to increase the quantity of poverty. One wonders almost if the most cheerful scenario is not the one in which an artificial virus gets out of the molecular biology labs and kills off all but the healthiest and happiest segment of the human race. I had better stop before I break out into Miltonian verse.

Kenneth E. Boulding

When can I come home?

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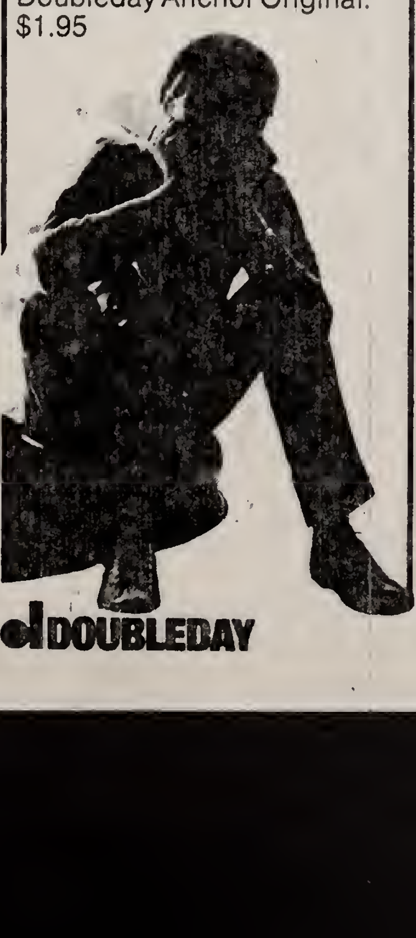

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of a limited class—it says something like this: a process of demoralization must long have been at work in Japan, speeded perhaps by the spiritual decay of Europe after World War I. (It is clear from Tanizaki's novel that "the last good times on earth" had begun to fade long before Pearl Harbor.) This process must have been stepped up, to the point of vertigo, by the total dislocation of World War II, the American firebombings, the two atomic blasts, the American occupation. It's just possible that a new chapter had already begun (with Oë's generation: on the bottom, no way further down) by the time Mishima's dramatic suicide put the ultimate signature on disintegration and despair. ☐

The Familiar Specter

THE LIMITS TO GROWTH: A Report for the Club of Rome's Project on the Predicament of Mankind. *By Donella H. Meadows, Dennis L. Meadows, Jorgen Randers and William W. Behrens III. Universe Books. 204 pp. $6.50. Paper $2.75.*

STEVEN D. ANTLER

Mr. Antler, who has done research in environmental economics, teaches at Memorial University, Newfoundland.

Since 1798, when Malthus first recorded his ingenious observations on geometric versus arithmetic series, the nature of exponential growth rates has fascinated social scientists. Exponential growth is the clown of mathematics; it is the Sunday supplement math puzzle: the man who grows rich by investing a penny at 10 per cent compounded continuously; the Persian courtier who, by bargaining with the king for one grain of rice on the first square of the chessboard, two on the second, four on the third, sixteen on the fourth, and so on, winds up with the whole kingdom's harvest. Exponential growth rates exist in nature as parts of complex systems. When social models attempt to divorce growth principles from the systems that bind them, there is a danger that exponential growth will cease to be a tool and revert to its role as clown. This is, unfortunately, sometimes the case with this otherwise excellent new book.

The Limits to Growth re-examines the familiar specter of coming "global catastrophe": growing population, industrialization and pollution, constrained by fixed resources—especially arable land—add up to disaster in the near future. In the general context of studies of this nature, Meadows and the rest of the M.I.T. group do a remarkable job of avoiding a lapse into mere hand wringing, although the hand wringing is certainly there. The book provides an excellent example of one framework within which global ecology can profitably be studied, but nevertheless it is ultimately unconvincing.

Given data, causal relationships between variables, correlation between variables, and so on, computers are able to "simulate" reality with at times a fair degree of accuracy. The Meadows group has integrated world population, industrial output and availability of resources into one grand simulation model of per capita standard of living throughout the world for the next thirty to fifty years. A "standard run" of the model suggests that we may expect a massive decline in per capita production of both food and industrial products some time in what appears to be the 1980s (the time scale is purposely vague). A second run based upon the hypothesis that world resources as of 1900 have somehow been doubled changes the details but not the conclusions. Another run, this time with "unlimited" resources, again leaves the basic conclusions unchanged.

When the preliminary draft of *The Limits to Growth* was presented in Moscow, the chairman of the meeting argued that man "is no mere biocybernetic device"; his criticism may mirror some political objections to the book, a number of which I believe to be well taken. In addition, however, his statement probably reflects a common distrust of computer models which, when raised by social scientists whose approach is nonquantitative, is often based on misunderstanding. An econometric model almost never "proves" anything, in the normal use of the word. It says "what it says," which is, usually, something like: "seventy-five times out of a hundred we may expect to see the predicted outcome, if the hypothetical relationships between variables that we have proposed are in fact the true relationships between variables—recognizing, of course, that they may not be." Furthermore, critics of econometric models often assume that absolute, measurable changes in variables are more important than direction and rate of change. Since Edgeworth, economists have (rightly, I think) been more concerned with the latter characteristics than with the former. In emphasizing the direction and quality of change, the Meadows group may help to clear up this misunderstanding—although in so doing they have exposed themselves, in the eyes of unsympathetic critics, to the charge of hedging on their conclusions.

The theoretical basis on which Meadows' model rests is supplied by traditional economics. However, there is an annoying kind of two-dimensionality to the analysis. The fact that some fixed resource—e.g., land—cannot indefinitely yield increasing increments of product when worked by a variable factor—e.g., labor—is as old as Ricardo. In the present context, the fixed resource is the earth, while the population of the world is substituted for the farm laborers. With Ricardo, diminishing returns is one part of a broad model of the distribution of wealth. Distribution, production an

NAKED ROUND

Round round the round
She paces
The girl from Iran
Fierce of face,
Heavy breasted
Clothed only in her hair
Black snaking
Round round the round
In the foyer of the theater in the round
Lunging like a yak
From the stage round
Where she sits odalisque
While the Sodomites orgy beneath
She paces round round the round
Naked round like a hostile tribe
The girl from Iran
Round round naked round
Her mind done up in many petticoats

Emilie Glen

political structure that bounds them, are not and cannot be independent in the Ricardian system. This is why he is a political economist." In the Meadows study, mechanisms of income distribution are political and social variables taken as outside of the model; they are independent, assumed to be fixed and given.

The doctrine of population growth—that human and animal populations will expand geometrically to the point where further growth is limited by the fixed resource base—is of course Malthus' contribution. It was and remains one of the most ingenious observations in the history of science. As a long-run theory of poverty, however, it has been discredited for some time. In the underdeveloped world, there is a poverty level so low that there exists no significant difference between the standard of living of a childless couple, and one with many children. In this setting, however, children are a form of old-age insurance, since parents surviving past the point where they are able to work will still have their children to take care of them; the childless couple has no security of this sort. There is statistical evidence demonstrating an inverse relationship between infant morbidity rates and parents' fertility rates in Latin America, suggesting that the more parents feel their children will survive the fewer children they tend to have. This is consistent with the general observation that fertility rates and standards of living are inversely related.

This is the point at which the model's shortcomings become clear; if distribution is not a variable within the model, per capita income is left as an unsatisfactory proxy, a poor and unreliable measure of standard of living. Whether growth is exponential or linear, without information on income distribution neither per capita nor absolute levels of output will yield usable information on standards of living. In as sophisticated a simulation model as that of Meadows, we might have expected a computer run carried out under the assumption that industrial output has been redistributed. What would happen if world resources devoted to maintaining inequity were redirected toward development of the Third World? The United States has, in effect, made Vietnam a very wealthy nation; the problem is that the wealth has all been spent in Saigon, or in U.S. armaments plants. What would have happened to Vietnamese population growth had the money been spent on life, not death?

This sort of question is no more far-fetched than those behind the "second" and "third" runs of the model, where different levels of resources are assumed. But the question I have posed is qualitative, rather than quantitative. It assumes changes in institutions, rather than in physical quantities. Where the qualitative variables—the institutions—are assumed to be fixed, the only solutions possible are those involving human and physical resources. We are left to attempt to maximize welfare under the existing social structure by adjusting the activities of human beings.

Accordingly, the authors argue that the Green Revolution only "tends to cause widening inequality" when economic inequalities already exist. Wealthier farmers, those able to utilize mechanized agricultural methods, use the new varieties of seed to improve their lot at the expense of the small farmers, thereby increasing the level of poverty and unemployment. As an example of technology's inability to circumvent diminishing returns, the example is patently unconvincing. The problem obviously lies in the social structure that protects the wealthy farmer, not in technology.

The Limits to Growth, then, attempts to analyze qualitative problems as if they were quantitative. One of the early graphs illustrates the fact that "differences in exponential growth rates are widening the economic gap between the rich and poor countries." Of course, this is a bit silly. Differential growth rates do not cause inequalities; rather, they *are* inequalities. The causes are to be found somewhere off the graph. The Meadows group continually confuses the time path of the development of a problem with the problem itself.

This is not to say that qualitative social change can never be dealt with through quantitative methods. The "global model" might, to some extent, lend itself to this very purpose. As it stands, it is still an interesting framework, although there are some points that I find confusing. Pollution appears as a function of per capita industrial output rather than as a function of the absolute level of output. Industrial capital appears as a function of investment, rather than as a function of investment in capital goods industries. The model itself is presented in a highly simplified form in *The Limits to Growth*. It is to be hoped that these failings will be rectified in further studies.

It would be wise, I think, to approach Meadows' recommendations (if they can be called that) with some caution. They are rather mechanical and naive. It is suggested that with stabilized population growth and resource consumption, the rediversion of resources to the agricultural sector, and the institution of resource recycling on a large scale, world population can be stabilized at an average per capita income of $1,800 annually (it is less than $500 at present). Of course this is an attractive prospect, although it still remains to be seen how the $1,800 would be distributed.

More important, however, are the implications of the suggestion. Compulsory birth control is one step away from a preferential system of allocation of the right to reproduce, and two steps away from "scientific" eugenic control and genocide. It should be made clear that the Meadows group goes out of its way to insist that it is *not* suggesting compulsory birth control. But at what point does the "scientific" presentation of impending catastrophe become a rallying ground for those who would favor centrally imposed zero population growth? Similarly, the Meadows group hedges on the issue of economic planning; at what point does the impending catastrophe become a rallying ground for proponents of some repressive form of corporate capitalism?

It would be a mistake, given only the information in *The Limits to Growth*, to read too much into Meadows' proposal for a "steady state." The apolitical nature of the analysis, however, seems to suggest that the proposal represents the way in which things can be changed while insuring that they remain more or less the same. There is no reason to believe that patterns of distribution would be altered in the steady state, and the adjustments

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suggested for the various growth rates are, as mentioned above, tailor-made for the present social structure.

Meadows' study was prepared as a report for the Club of Rome's "Project on the Predicament of Mankind." The Club of Rome itself appears to be an international organization of industrialists and consultants, and is headed by Dr. Aurelio Peccei, a consultant affiliated with Fiat and Olivetti. *The Limits to Growth* was apparently financed through a grant from the Volkswagen Foundation.

Ecology is often thought to be the coming "revolution" of the 1970s. The Club of Rome may in fact remember how the Italian aristocracy has traditionally survived revolution: the way one insures that one will make it alive through a revolution is to lead it. The question the rest of us must ask, of course, is "where"? ☐

ART

LAWRENCE ALLOWAY

Jackson Pollock wrote of one of his paintings that it "came into existence because I had to paint it. Any attempt on my part to say something about it, to attempt an explanation of the inexplicable, could only destroy it." The antagonism of word and art is no longer an article of faith, and not too many artists would want to claim their art as something inexplicable. A principle of co-expressibility is assumed, in which verbal and visual forms can be translated into one another, with at least partial congruence. In fact, artists of our time have demonstrated that they are a very articulate group: the literature of art in the 20th century has been, to an unremarked extent, in their hands. I mean by this a good deal more than the writing of manifestos—programs of future action which can only be written by the artists themselves. On a broader basis, however, there were substantial magazines such as *De Stijl* (1917-31), with Mondrian's and Theo van Doesburg's articles, and *L'Esprit Nouveau* (1920-27), edited by Le Corbusier and Amédée Ozenfant and including their own pieces along with Fernand Léger's. Later there was *Cobra* (1949-51), which coordinated expressionist figurative art in Northern Europe, and *Zero* (1958-61), which developed pro-technological ideas about art and an aesthetic of systematic structure for a cosmopolitan European scene.

In New York since the late 1940s a steady flow of verbal information has been originated by artists and distributed through public discussions, magazines and catalogues. The discussion group started at an artist-run art school called "Subjects of the Artist," which held regular Friday night lectures and panels in 1948-49. The school collapsed but the lectures were continued at "Studio 35": selections of discussions here in 1949-50 have been published (in *Modern Artists in America*, 1951, editors, Robert Motherwell and Ad Reinhardt). These meetings led to the Club, or Artists' Club, founded in 1949 which continued for two decades. Several magazines specialized in using artists as writers, notably *Tiger's Eye* (1947-49), which printed important texts by Adolph Gottleib, Motherwell, Barnett Newman and Mark Rothko, and *It Is* (1958-60), which covered thoroughly the expressionistic side of New York art.

At present two magazines devote themselves exclusively to the words of artists, *Art Now: New York* (University Galleries, 520 Fifth Avenue, New York City; $15 per year) and *Avalanche* (Kineticism Press, Room 303 E, 200 Park Avenue South, New York City; $7 per year). The former provides paired color reproductions and specific commentary by the artists; the latter takes the form of a transcribed talk show, discursive in subject and "realistic" in style, seeking the gritty feel of the studio and the presence of the artist. There are two kinds of catalogue, small announcements by commercial galleries and booklike texts from museums, and either can be valuable when they contain artists' writings. For instance, between 1944 and 1947 Newman wrote several very significant pieces for the Betty Parsons Gallery, and in 1952 the Museum of Modern Art, in the catalogue *15 Americans*, published texts by Rothko and Clyfford Still which were widely circulated at the time and have been quoted ever since.

The first statements on Pop art from the artists were elicited by Gene Swenson in interviews in 1963 and 1964. This form of data collection developed exceptionally in the 1960s, including a notable series of broadcasts moderated by Bruce Glaser: in 1966, for example, he interviewed Claes Oldenburg, Roy Lichtenstein and Andy Warhol on the subject of Pop art, and Frank Stella and Don Judd on post-Abstract Expressionist abstract art. Much of this firsthand news has not been used; writers have tended to do a new interview rather than interpret the existing ones. The availability of living artists for consultation is, obviously, an advantage to their critics, but it can have an inhibiting effect. The authenticity of the artist's statement tends to constrict writers who feel bound to stay within limits set by the
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READING ABOUT RESOURCES

by Monroe Bush

The Limits to Growth, A Report for the Club of Rome's Project on the Predicament of Mankind, by Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III. A Potomac Associates Book. Universe Books, New York, 1972, 205 pp., $2.75 (paperback).

THE purpose of this mind-boggling report is, according to its authors, to "open" a debate as to how "the transition from growth to global equilibrium" can be accomplished. They allow us an outside limit of 100 years to achieve global equilibrium of population, agricultural production, natural resource use, industrial production, and pollution control—there may be even more stringent limits to the social fabric which presumably subsequent reports will measure. Failing this achievement, "the most probable result will be a rather sudden and uncontrolled decline in both population and industrial capacity." One can only presume that in such an event the human race, through massive disequilibrium, will slide into a twilight zone in which the horizon is lost sight of in valleys of tribalism, starvation, and brutalization.

"The Club of Rome" is the rather pretentious name adopted by a group of 30 scholars and scientists from ten countries who met in Rome in 1968 at the invitation of Dr. Aurelio Peccei, an Italian management consultant. The membership has since grown to 70 or more persons representing 25 nations. Seeking to correlate and identify the complex of problems that plague mankind, the Club chose the term "world problematique" to represent the threats under which we poor souls live out our little lives.

Every ameliorative thesis poses a "problematique" and suggests its solution. In this era of the selling of presidents, however, Madison Avenue has successfully invaded the self-sanctified preserves of science to promote its peculiar brand of anti-intellectual packaging. Too often we are coaxed to judge the result on the basis of who participated, and where, and at the cost of how much money. Ideas achieve an importance of sorts through the reverse of the old Joe McCarthy coin virtue by association. A meeting held in Aspen or Williamsburg inclines to greater stature than one held in Spokane, for instance, or Indianapolis. An international confab wins more public Brownie points than one that draws only from a few U.S. states. Not infrequently we mistake the expense account for hard thinking. And finally, we forget that the quickest way to prostitute a good idea is to submit it to a committee. Because of these tendencies it is imperative that ***Limits to Growth*** be studied solely for the accuracy of its techniques and the merit of its ideas—as if, in fact, it had been prepared in Kansas City by three graduate students.

There appears little significant distinction between the Club's conclusions, computerized, systems analyzed, and jargon-dressed, and the one-man one-typewriter approach of such comparative loners as Fairfield Osborn *(The Limits of the Earth)*, Harrison Brown *(The Next 100 Years)*, and Barry Commoner *(The Closing Circle)*. Give and take figures here and there, and the specific phrasing of conclusions that are, at best, mere guesstimates, you find virtually the same conclusions. Despite the attention this report has received in the news media, informed men have long since known, without benefit or need of computer feed outs, that the world's population is explosive, its agricultural production inefficient (and insufficient), its resource base in mortal danger, its industrial production wasteful and often trivial, and its increasing pollution intolerable. It is also no secret that the world's political leaders, presumably equally aware of these incipient disasters, are nevertheless preoccupied with the existential present. In the third place, men understood long before the time of Plato that average folks, the little people whom the late Estes Kefauver was accused of wooing as the "pigmy vote," are too concerned for the next meal, or the next rent payment, to trouble their harried lives with the fate of mankind in 75 years.

The Limits to Growth, through interesting exercises, risks the unnecessary obfuscation of long-term problems. For example, there is something precious, *à la* McNamara's Whiz Kids of the early Sixties, in the warning: "Decision-makers at every level unconsciously use mental models . . . We, too, have used a model. Ours is a formal, written model of the world . . . Since ours is a formal, or mathematical model it also has two important advantages over mental models. First, every assumption we make is written in a precise form . . . Second, after the assumptions have been scrutinized, discussed, and revised to agree with our best current knowledge, their implications for the future behavior of the world system can be traced without error by a computer, no matter how complicated they become."

Two comments: this is no more than an intelligent procedure which the authors admit has been employed, mentally, by wise men throughout time; and the use of computerization, coupled with the use of the phrase "without error", implies an accuracy which elsewhere the authors admit cannot be, because, "The model we have constructed is, like every other model, imperfect, oversimplified, and unfinished."

Furthermore, the authors use an elaborate chart-system of what they call "feedbacks" to indicate relationships or interactions between the sev-

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eral principal elements of a problem. For some readers, this may be effective pedagogy; for others, no more than a clever device which could easily be expressed in a sentence or two.

In this effort to prove that what the Club of Rome has done is *new*, the impact of the report can too readily be lost in endless argumentation over methodology—which the authors themselves have invited, being equally concerned with methodology. So engrossing could this become that scarcely anyone will consider the book's thematic conclusions, which are an enriching restatement of what thousands of scholars have been saying for 25 years.

But what of these conclusions? And do they include solutions, or at worst even possible if improbable solutions? (For all of its sophistication, the Club of Rome falls victim time and again to the weakness in us all for linear thinking. For instance, ". . . one possible limit to food production—arable land. There are other possible limits . . . The most obvious one, second in importance only to land, is the availability of fresh water." Obviously one is not first and the other second in importance, since you cannot have arable land without fresh water. The computers should have made that clear.)

The solution offered is "The Equilibrium State"—a concept men have variously described as social and economic harmony with nature, sound environmental management, sustained-yield resource use: old-fashioned words which the Club brings up to date. ". . . the most basic definition of the state of global equilibrium," the authors tell us, "is that population and capital are essentially stable, with the forces tending to increase or decrease them in a carefully controlled balance." Hopefully environmental preservation would be one major consequence of this ideal. Requirements for achieving an equilibrium-utopia are three: (1) "The capital plant and the population are constant in size;" (2) "All input and output rates—births, deaths, investment, and depreciation—are kept at a minimum;" and (3) "The levels of capital and population and the ratio of the two are set in accordance with the values of the society." That third point is a real hooker.

Scientists may acknowledge, *sotto voce*, but rarely confront the fact in cold print, that they are no more than (and just as much as) scientists—one of society's essential, most honorable professions. However, they are not politicians. Once the problems—or "world problematique"—have been clearly defined in outline, it remains then the responsibility of politicians to implement practical steps toward remedy. And scientists make lousy politicians, just as the converse is true.

Unfortunately, this compounds the difficulty. It is a fact of life which leaves all scholarly prognostications, including ***The Limits to Growth*** hanging in limbo. Because, as scientists are not quite as knowledgeable as some would prefer we think, so too politicians are rarely as wise or effective as it is comfortable to suppose. The truth is that there is not, in fact, such a thing as an "elite." No matter how high we climb the ladder, we climb it with feet of clay. Mankind's destiny rests on men, and the difference between men of distinction and men of obscurity is minuscle.

What is desperately needed, therefore, is not another analysis of the world's end-of-time situation, but a book or a leader who proposes an acceptable method of achieving the transitions which are required, and of doing so without damage to the dignity of the individual. There is general agreement throughout society's informed leadership of the critical problems that scream for resolution. But no one tells us how the miracle is to be wrought.

Therefore, it is more likely than not that we are approaching insolvable predicaments between human society and the physical environment which sustains it. ***The Limits to Growth*** is but one more—and in this case pretentious-book that makes this fact "perfectly clear." There seems to be nowhere the wit or will to grasp the dilemma and wrestle it to victory, not when there are payrolls to be met and dividends to be paid and votes to be won and the present to cope with. No one is at fault except us all. ■

How To Enroll in the World Forestry Congress

The Organizing Commission for the VII World Forestry Congress has made known their desire to learn as early as possible of the probable number of participants from the United States.

Registration for the Congress will begin on Tuesday, October 3, at 9 a.m., at the Congress Headquarters. The enrollment form, can be used *at any time* to indicate bona fide intention to participate in the Congress. It should be sent to:

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The enrollment fee is payable in Buenos Aires at the time of registration. The fee for enrollment as a Member is $30; for Associate Member $10. The printed Proceedings of the VII World Forestry Congress can be ordered for $35.

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For an enrollment form write to The American Forestry Association, 1319 Eighteenth Street N.W., Washington, D.C., 20036.

There are a few places left on AFA's pre-Congress tour to South America, September 14th-October 6th, 1972 ($1685). See April issue, page 27, or write AFA for further details.

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Book Reviews and Reports

Publications on these pages are available from the address indicated and are usually free unless a price is given.

Growth and ecology

THE LIMITS TO GROWTH — *A Potomac Associates Book. 1707 L St., N.W., Washington, D.C., 20036. 205 pp. paperbound, $2.75. 1972.*
IN DEFENSE OF PEOPLE — *By Richard Neuhaus. MacMillan Co., 866 Third Ave., New York City 10022. 315 pp. $6.95. 1972.*

The first of these books, the work of a prestigious group of scientists carrying the name of The Club of Rome, has been joyfully embraced by the more literate of society as further "proof" that technology is forcing us to total and inevitable doom. Many of our more articulate people are somewhat like the religious cults of the past who prophesied confidently and morbidly that the end of the world was imminent.

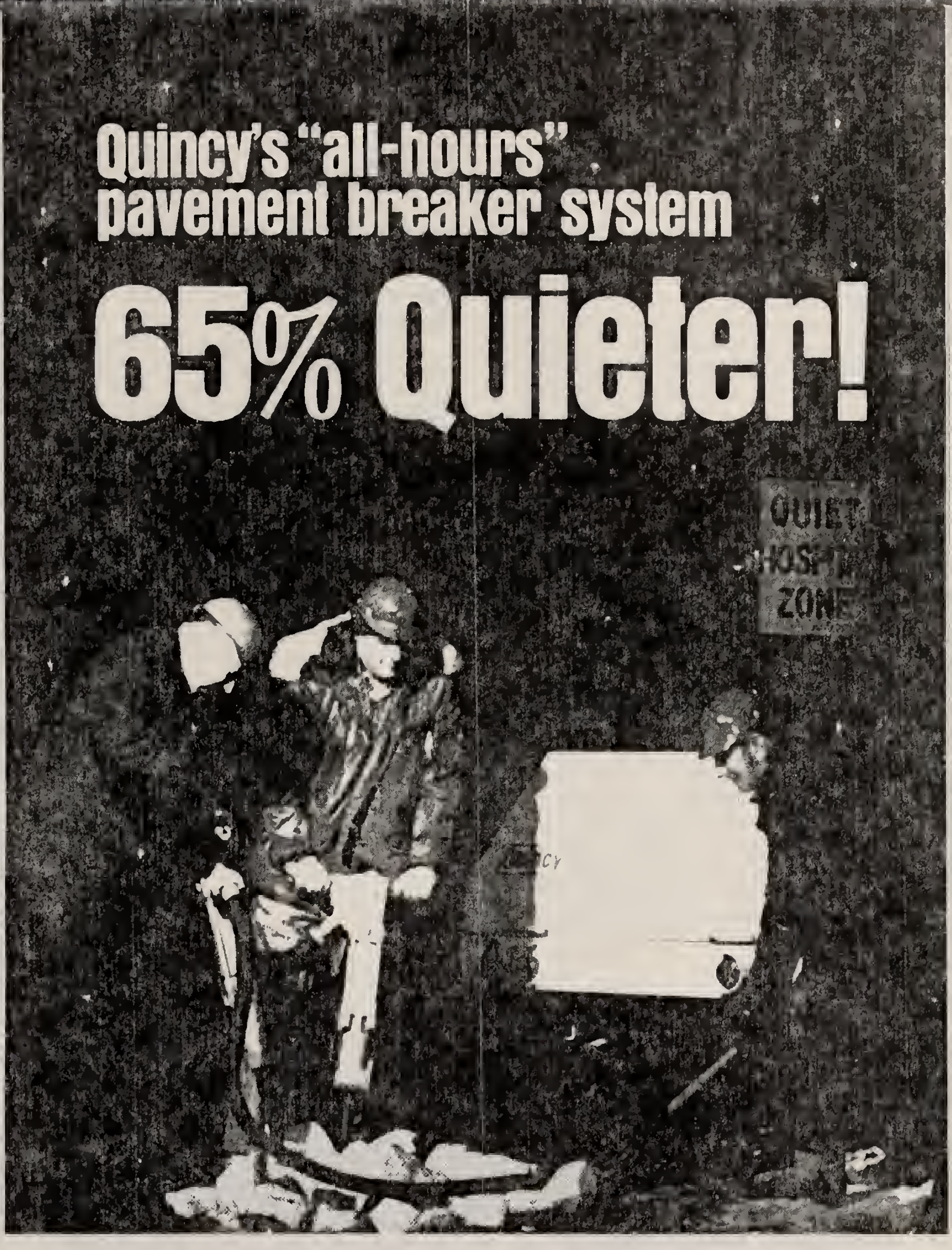
If you read the book carefully, instead of superficially, you will discover that the scientists themselves have reservations about the answers that their computers are producing. Computers really are in their infancy, and, contrary to popular belief, they do not always tell the truth. They cannot correct a misstatement fed into them, nor can they analyze data that have not been supplied to them. The scientists recognize that many factors may not have been given sufficient weight. Technology can advance and make changes; new resources can be developed. The Club of Rome is ready and happy to accept criticism of its work.

We offer this suggestion: they frequently refer to "exponential growth," but rarely name the exponent. We submit that there is none. A common phrase is that " — if the present trend continues." But trends always have changed, and probably always will.

The report anticipates that in the year 2000, Japan will have a gross national product (GNP) of $23,200 per capita, or more than double that of the United States. Some way or another, we doubt these GNP figures. What the scientists probably should have done is to feed an integral calculus equation into the computer to determine maximum-minimum.

But at the same time, the computers expect that the GNP of China, per capita, would be only $100, of India, $140; of Indonesia, $130; and

(Continued on page 39)



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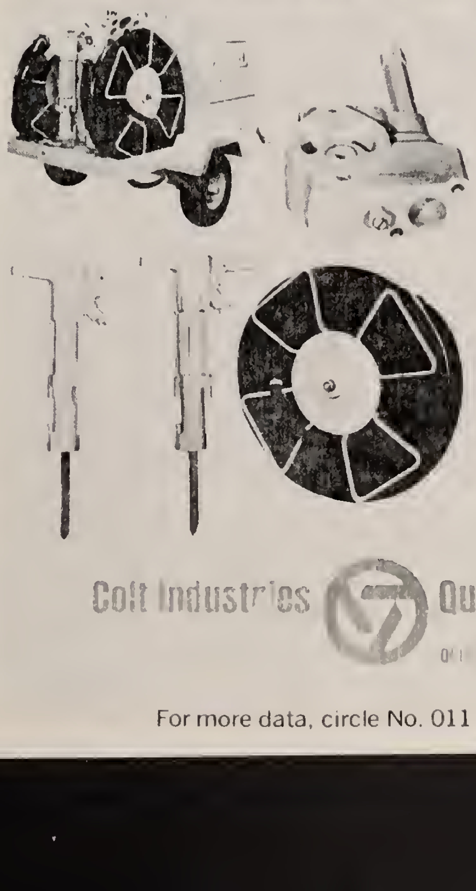

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BOOK REVIEWS . . .
(Continued from page 37)

of Nigeria, $60. No matter how many reports the Club of Rome delivers, it is silly to expect these countries to start limiting their growth until they have increased it to a figure at least as high as the Soviet Union. And when India and China increase their GNP, the Club's limits of world growth will take a beating.

Scientists must use these computers. It is their obligation. Yet, as we mentioned earlier, computers and calculators can be wrong. Who doesn't recall the scientists who proved aerodynamically, that a bee could not possibly fly, that its body is too large and its wingspan too small. Yet the rascally bee did fly. Later, those same scientists learned a little more about aerodynamics and were able to prove that the bee could — something that the bee knew all along.

Today, if you take the known knowledge of air pollution, and atmospheric interaction with it, and feed this into a computer, you can prove that most large cities cannot exist because of the concentration of sulfur dioxide and of carbon monoxide in the air.

The trouble is that neither sulfur dioxide nor carbon monoxide concentrates as the computer says it should. Something happens to both that we don't understand. Yet this should not prevent us from using a computer to analyze air pollution.

Similarly, we are confident that the Club of Rome will learn a little more about the world situation, sharpen their inputs, improve their computers, and deliver us more useful findings, although less spectacular.

The Rev. Richard Neuhaus' contribution makes welcome reading during these days of hysterical ecology. You should get it. His credentials are impeccable. He has campaigned against the war in Vietnam, for racial justice. He is a pastor of the Lutheran Church of St. John the Evangelist in Brooklyn where life is real and hard.

He takes the ecology movement apart where it deserves to be dismantled, piece by piece. He says what some of the rest of us have been arguing for a long time, with limited success.

Believe us, you will be impressed with it.

Traffic ecology

Environmental Management Planning for Traffic: *by Jim Antoniou. McGraw-Hill Book Co., 330 West 42nd St., N.Y., N.Y. 1972. 171 pp. $19.50.*

This timely book is concerned primarily with the organization of traffic *within* towns and cities, in a local structure of streets giving access to residential and working areas. It puts into perspective all the factors and problems involved, suggests techniques for carrying out short-term improvements in relation to long-term solutions, and gives vivid examples from both sides of the Atlantic of what can be achieved. The planner's goal is seen as a continuous process of maintenance and readjustment, and of coordinating new concepts, as/and/when they materialize, into the existing structure of streets and thoroughfares. The emphasis throughout is on the protection and management of environmental qualities.

Administration and Government

Skokie, Ill. — Employee Handbook. The Village of Skokie, 5127 Oakton Street, Skokie, Ill. 60076.

Wastewater

General — Minimizing Sewer Infiltration, by Edgar W. Spinzig, Jr. P.E. and Arthur T. Brokaw, P.E. Papers presented at the American Public Works Association Annual Congress and Equipment Show, Sept. 1971, Philadelphia, Pa. Copies supplied free from Mr. Brokaw, President, Brokaw Engineering Associates, Inc., 1101 State Road, Princeton, N.J. 08540

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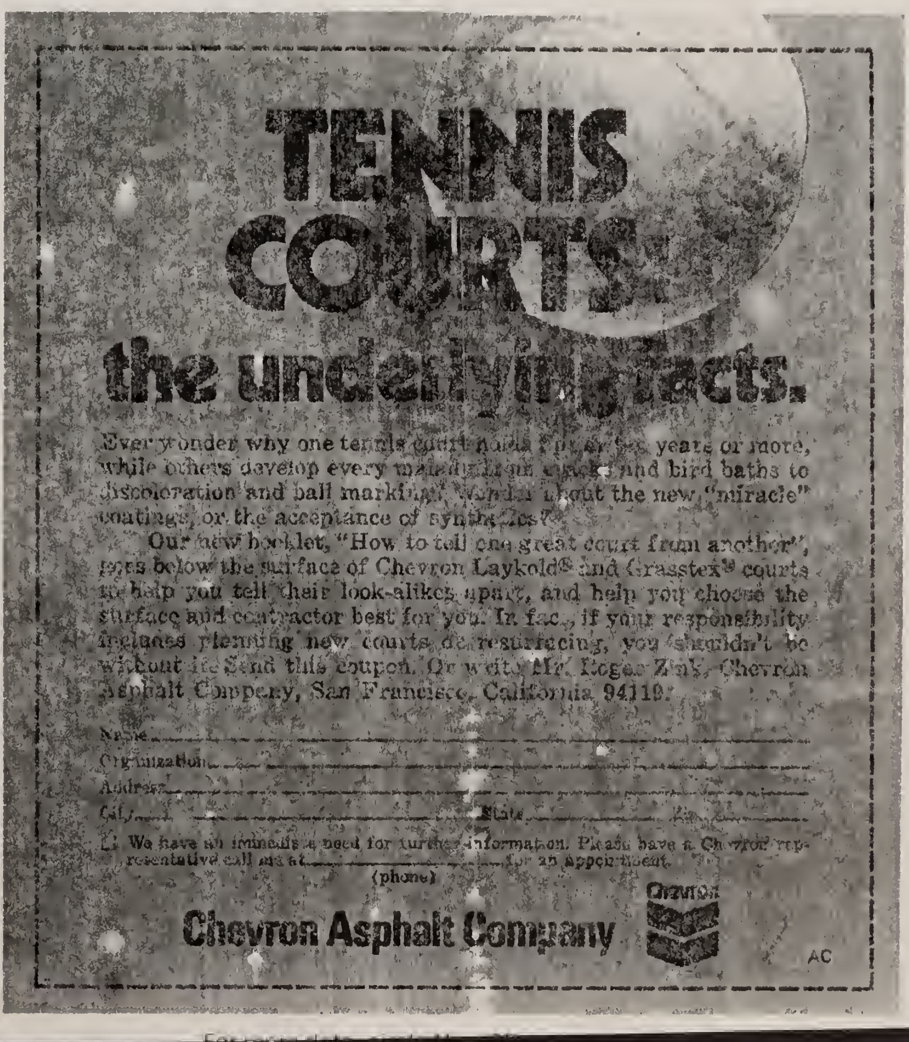

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more weight on historical analogies than they can bear. But what is essential is the need to stand back, to take a wider look at a debate which, however important it may be for the future of Man, has the property that it is universally confusing to men. This confusion seems to result from the fact that we regard the debate as a purely scientific one, rather than as a wider and deeper argument where scientific concepts are used as weapons, as means to a semi-religious end.

It is worth turning our attention to the way in which these scientific weapons are deployed in some particular area of the doomsday debate. Specifically, let us look at the use of computer techniques as exemplified by the *Limits to Growth* study.[9]

The chronology of this particular area of the debate will be familiar to most people, and can be summarised briefly. In March 1972 Professor Meadows and his colleagues at the Massachusetts Institute of Technology published their book describing simulations performed on a mathematical model of world society. The results of these simulations purported to show that we were headed for global eco-catastrophe in about 2020 A.D. unless we decided to mend our exponentially growing ways. Further, and more alarmingly, the authors went on to claim that the basic "overshoot and collapse" behaviour mode of their model was not significantly changed by virtually any feasible change in underlying assumptions or policies, and followed this up with a startling assertion:

> We feel that the model described here is already sufficiently developed to be of some use to decision-makers. Furthermore, the basic behaviour modes we have already observed in this model appear to be so fundamental and general that we do not expect our broad conclusions to be substantially altered by further revisions.

The book was a runaway success, selling well over half a million copies in Holland alone and God knows how many in the United States and elsewhere. By the summer of 1972, Meadows was, in a limited sense, a "world figure." The modest M.I.T. Assistant Professor was transformed in a few months into the confident adviser of governments. In Britain he was given an interview on *Late Night Line Up* and the rare privilege of a private "huddle" with the Science Research Council.[10]

Since those heady days nothing much has happened—at least so far as the general public is concerned. Meadows has gone to a tenured Chair at Dartmouth College, various academics in this country and elsewhere have tried out his modelling techniques, and the public has been left with a vague, but lasting, impression which is perhaps best summarised by the headline: COMPUTER PREDICTS CATASTROPHE.

There can be little doubt that, at least as far as the general public is concerned, the Meadows intervention in the doomsday debate has been outstandingly successful in winning people round to the apocalyptic point of view. I have myself been told by non-scientific friends that they found *The Limits to Growth* convincing because "computers have no axes to grind." (The same people, incidentally, do not hesitate to criticise other protagonists in the debate for their implicit bias. This distrust seems to be particularly aimed at economists like Professor Beckerman who are seen as having a vested interest in the price

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JOHN MURRAY

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[9] *The Limits to Growth.* By D. H. Meadows, D. L. Meadows, Jorgen Randers and William W. Behrens III. Earth Island, £1.

[10] See J. Meade, "Limits of Models", *New Scientist*, 20 April 1972 for references to a discussion of *The Limits to Growth* at the U.S. Embassy, London, on 13 April 1972 in which Meadows addressed an influential slice of the British academic and political establishment.

Encounter.

mechanism[11] which devalues their contributions.)

There is not much point in trying to analyse the absurdity of this kind of attitude. The fact is that such attitudes exist and they are important determinants of the way in which the public looks at the environment debate. Professor Meadows succeeded in his attempt to sway the debate because people were persuaded that his study was objective, scientific, and—since it involved the use of computers—likely to be more accurate than previous predictions of doom. Let us briefly examine each of these in turn.

Was it objective? Consider the following scenario: Meadows and his team were raised under the protective wing of Professor J. W. Forrester at M.I.T. Forrester is the inventor of the computer modelling technique (known as System Dynamics) which was used to construct the model on which *The Limits to Growth* was based. Forrester believes that his technique can be applied to any social system[12] and in 1970 he published a model of the world[13] which predicted global "overshoot and collapse" early in the 21st century.

By and large, Forrester's world model received scant public attention, with one or two notable exceptions. One of these was the Club of Rome, a mysterious collection of top dons, bureaucrats and industrialists who had already concluded that the world was coming to an end. The Club persuaded the Volkswagen Foundation to finance a research project to build an enlarged version of Forrester's model at M.I.T. The man who led that project was a committed young environmentalist named Dennis Meadows.

The Meadows model is larger than Forrester's, but in structure and concept it is essentially the same. And it produces very similar results to those generated by the original prototype. So we are driven to ask if *The Limits to Growth* was in fact the result of an "objective" study? Or was it purely an exercise in public relations, designed to give credibility to a foregone conclusion by playing on popular misconceptions about the power of computers?

SECONDLY, was it a scientific study? The answer obviously depends on what you understand by the term "scientific"; it is a pin-head on which I do not propose to dance at this time. But there is one very disturbing aspect of the *Limits to Growth* story and that is the fact that no detailed information about the underlying model was given in the original publication. And, what is more, the Technical Report containing this information has *still* not been published. In other words the scientific community has been denied the data necessary to make a critical examination of the assumptions and structure of the model—except at the whim of Professor Meadows.[14] This is a curious way for scientists to behave—especially in a controversial subject-area which they believe to be of earth-shattering importance. As Beckerman puts it:

> This is like my publishing a scientific book, showing that the world will soon come to an end on account of increasing instability of sub-atomic particles and mentioning, *en passant*, that in order to reach this result it was necessary for me to overcome the little problem of the Heisenberg uncertainty principle, but that I would not bore readers with the details of how I did this. If they were really interested they could read about it in a paper I presented to a conference of the Railwaymen's branch of the YMCA.

One does not have to go as far as this to find it distinctly odd that, apart from *The Limits to Growth*, the only publication to emerge from Meadows and his team so far is an innocuous collection of articles on garbage disposal, D.D.T. and other related topics.[15]

Finally, *are the Meadows predictions likely to be accurate*? From what I have seen of the crudity and naïvety of the model's assumptions, I doubt it very much. Note that I am not condemning the model itself for being crude and naïve; it is in the nature of these models that they are cheap and nasty compared with the complex social reality which they are designed to mimic. All I am saying is that we are obliged to be very sceptical when they tell us to expect global eco-catastrophe in 2020 A.D. To say this is simply to paraphrase the consensus of the scientific debate about *The Limits to Growth*. It is not an original or indeed even an interesting statement; but I have a feeling, from watching the media coverage of the debate, that it needs to be said.

IT ALL COMES BACK in the end to the need to take a wider view of the doomsday debate, to try to place the various protagonists in their proper

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[11] And indeed he does. Professor Beckerman, however, also has a commitment to common sense—which is more than can be said for some of his critics. See his wickedly amusing Inaugural Lecture (*Oxford Economic Papers*, November 1972) for some of the reasons why he is so unpopular with the environmental movement. I have no reason to believe that his next book, *In Defence of Economic Growth*, to be published in 1974 by Jonathan Cape, will do much to increase his popularity among his critics.

[12] Two of Forrester's earlier books, *Industrial Dynamics* (1961) and *Urban Dynamics* (1969) describe models of a commercial firm and a city respectively.

[13] *World Dynamics*, Wright-Allen Press (Boston).

[14] Professor Meadows has made successive typescripts of the Technical Report available to a number of selected research groups around the world, notably the Fondacion Barriloche in Argentina and the Science Policy Research Unit at the University of Sussex.

[15] *Toward Global Equilibrium: Collected Papers.* Edited by D. L. MEADOWS and D. H. MEADOWS. Wright-Allen, £9.

GLOBE + MAIL
16 MAY 86

Reaching the brain

The article Long-Term Trend Reveals Oil Price Is Settling Back (April 26) mentions that actual cost trends of natural resources are behaving not at all as had been forecast in the Club of Rome's "doom and gloom" book Limits to Growth, published in 1972.

That is a revealing comment. The book cited was exposed as foolishness within a week of its widely touted release. Four years later, the Club of Rome quietly reversed itself on the conclusions of its own brainchild. Economist Julian L. Simon has some frank comments on these proceedings in his own book, The Ultimate Resource.

But these facts seem to have escaped the notice of our educational-informational complex and various governmental bureaus. Your reporter is about 14 years late in paying tribute to reality. Still, as they say, better late than never.

On the other hand, consider our schools and the federal Department of Energy, Mines, and Resources. They are still plugging blindly along, proselytizing the book's social and economic hype as if there were no tomorrow.

In bureaucratic circles, information must travel a convoluted path indeed before it reaches the brain.

David Morgan
Halifax

16 MAY 86.

THE MERCANTILE ETHIC

(The looting of a continent)

Introduction and Outline

The Mercantile Ethic is the ethic of the merchant and the trader, and derivatively, of the politician and the prelate, the artisan & the artist. Its origins predate history, for exchanges of goods and services have been very intrinsic processes in the development of civilization, and the survival of societies. In the beginning the merchant and the trader were peripheral adjuncts to the central society. As productive technology advanced, they became more essential ~~elements functionaries~~ components of more complex economies, until, in the days of the great trading nations such as Britain Holland ~~and~~ France and Spin, they became partners in the rise and fall of empires.

broader

(ETHIC - The principal of right or good conduct, or a body of such principles.) In sociological terms, ethics might be defined as a set of Norms. By way of further definition, a Norm is described as as an abstract pattern in the mind that sets certain limits for behaviour. Different societies have ~~different~~ varying sets of Norms at various stages of development. They may be viewed as an adaptive and controlling characteristicsof ~~society~~ any society. Some are coercive in nature. / mechanisms / most are implied or specialized to serve specific groups. Mor will be said of the Ethic/Norm feature later.)

Several major ethical systems have been recognized and widely written about. such as the Christian ethic, the Protestant ethic, the work ethic, business and professional ethics, and so on. Within this mix, the Mercantile Ethic has been an important and growing component, but until recently not a prSincipal or determining factor. But there is evidence now that the M ercantile Ethic has become the dominant credo of the ~~western world~~ industrialized world, in particular in America, where it determines the course of contemporary history to the point of self-detruction - the looting of a continent.

Ethical systems do no stand by themselves. They do not constitute ~~an~~ the physical components themselves, but rather the techniques and rules govern- the use of the physical elements, be they people or things. Nor do they ~~represent cause and effect~~ determine, ~~in basically~~ initially, the physical or economic environment of a society. Ethical systems ~~are adaptations to~~ evolve as adaptations to ~~the original~~ a cphysical context and only in time do they come to assert a ~~governance of the~~ measure of control over the environment.

The Mercantile Ethic is the enthic of the Price System. of operating an economy.

A Price System is any system of production of goods and services based on exchange values and using a medium of exchange, such as money, To this point in history, all national economies have been price systems, operating in a context of scarcity and exchange values. Purchasing power in a Price System is based on the exchange of man-hours.

The mercantile ethic served well-enough throughout the ages of scarcity and hand labor, even down to the 20th century. Still operating at this time but with increasing difficulty, it is patently inappropriate for an age of advanced technology in which a plethora of goods are produced with an ever decreasing input of human labor.

1973 [illegible] Scott

This is a personal letter, though I may not know those who will read it, and they may not know me.

But we all know Howard Scott, and that is enough.

Word of his death - I learned of it through Ron Morgan - was a jolt, though it was not untimely nor completely unexpected. Then....remorse! I had planned to visit Technocracy HQ last October when I visited Wallops Island and Washington on business. I didn't quite make it to see the 'Chief'. And now...never !

Again this Fall I expected a business trip would allow me to visit your location but the assignment failed to materialize. So I write instead.

Who am I? Charter member of 9749-1, Winnipeg in 1936. Later a charter member of 9749-3, and still later active with the Calgary Section where I initiated a bulletin called "Alberta Reconnaissance". At the end of WWII I resigned from Technocracy when I was transferred to Regina to be in charge of a small staff of Federal civil servants. I felt this to be a necessary ~~step~~ move because of job, career and family.

I am still with the Civil Service of Canada, but contemplating retirement and "freedom" in a year or two.

My estimation of Technocracy and Howard Scott has not changed in 34 years. He is a pre-emminent figure in history, though generally ignored in life and at his death. His creation - Technocracy - is the shape of the future - if we have a future.

Yes it could be too late. Certainly there seems to be incalculable agony ahead. The mood of today is avoidance of the hard facts and major change, and encouragement of a babel of voices trying to amend but not discard the old ways. Temporizing will merely compound the disaster.

In a physical sense the components of a technocracy are being rapidly installed. Computers proliferate. Communications are growing rapidly to knit up the ganglia of the central "nervous" system of the organic technate. All this is hopeful. And in the end the physical structure will impose its unique mode of control and operation - technocracy. But at this late point there is still little evidence of an evolution in thinking - in understanding and acknowledging the problem of social control in a high energy society.

Scott observed that armies cannot stop an idea whose time has come. But the media can surely delay and confuse. And the ultimate cost of changing direction increases steadily.

So there can be no waiting now with confidence in the outcome. Technocracy Inc. must be supported, stengthened, as the only vehicle for the idea.

The terms 'technocracy' and 'technocrat' have come into common usage as part of the language, with vague and unspecific meanings. ~~Again:~~ Most everyone I speak to has heard of Technocracy. I am asking oftener now, and sometimes follow up with questions in depth. A one-man survey can be done by anyone. If provides a momentary 'fix' on an idea.

Key to Numbered Mailings.

		First Issue Date
1.	1929 vs. 1981 - A Comparison of Crises	20 JAN 85
2.	Big Bank Bailout	21 Mar 85
3.	Govt. Intervention on a New Scale	18 Aug 85
4.	Letter to CHQ re NY Times Clipping of 8 Nov 85	21 Nov 85
5.	Comments on "The Limits to Growth"	17 Jan 86
6.	Letter to CHQ re NY Times Clipping of 22 Jan 86.	13 Feb 86.
7.	N. A. - Scarcity or Abundance.	26 Feb 86.
8.	Canadians dying out, study says.	4 Mar 86.
9.	'Securitization' of the Debt Structure	12 mar 86.
10.	Has "Technocracy" been Revised.?	20 Mar 86.
11.	Letter of Resignation as Treasurer.	29 MAR 86.
12.	On the brink of Gloom + Doom. Edmtn Jrnl 8 Feb 86	
13.	MEXICAN Loans a Worry for the Banks: G+M 10 FEB 86.	
14.	FISCAL Stability Threatened - Edmtn Jrnl 16 Feb 86.	
15.	New Service Lists Activity of Insiders. G+M. 10 FEB 86.	
16.	Report to Members re Status of Unit.	12 Apr. 86.
17.	"A Question of Substance" - CHQ's reply to #10.	21 Apr 86.
18.	Reply to CHQ letter of 21 Apr. 86. re "Revisions".	8 Sep 86.
19.	Letter to L.W. Nicholson re his article in Tech Digest #80.	7 Oct 86
21.	Draft form letter re "Canada's Immigration Policy"	22 Oct 86.
20.	To CHQ re Howard Scott's letter of 22 Sep 62.	22 Oct 86.
22.	John Taube's letter of 15 Oct 86 + attach's.	25 Oct 86
23.	Letter to members: re Wind-up meeting.	8 Nov 86
24.	" " " : report on Wind-up	8 Dec 86
25.	Mead's Reminiscences of Howard Scott.	5 MAR 87.
26.	Comments on GM for 1988 memberships	1 Feb 88
27.	Comments on Chernobyl analysis of Cohen	22 Feb 88

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DISTRIBUTION LIST.

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No.	Addressee	25	26	27	28	29	30	31	32
1	CHQ	7/3/87							
2	Editor, Tech Digest	7/3/87							
3	Editor, NW Tech.	7/3/87							
4	Ron Morgan	7/3/87	3/2/88	22/2/88					
5	Jim Davidson								
6	John Gregory.	7/3/87	9/2/88	22/2/88					
7	Howard Rennick	7/3/87	9/2/88	22/2/88					
8	Ed Grech.								
9	John Waring								
10	Kay Callaway								
11	Al Fryers.								
12	Bonnie Gebhardt.	7/3/87							
13	Val Newcombe.								
14	Helen Diemert								
15	John Taube	7/3/87	22/2/88	22/2/88					
16	Pete Brewster								
17	Bob Taylor								
18	Louie Kildaw								
19	Oscar Isaac								
20	Bryan Kickham								
21	R. Barrett (Windsor)								
22	Arvid Petersen								
23	Mrs. Carl Olson (MS)								
24	Greg Parker (Grande Prairie)								
25	Dr. Ed Schaffer								
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27	Prof. Seymour Friedland								
28	Ross Deacon								
29	Peter Noel								
30	John Wilson								

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No.	ADDRESSEE	25	26	27	28	29	30	31	32
31	Gust Mattson								
32	John Miles								
33	Taras Rachuk								
34	Art Shaw								
35	Rick Woodward.								
36	Robert Gregory.								
37	Charles Spencer								
38	Alphi Green								
39	Cyril Large.								
40	Gordon Drever.								
41	Lois Scheel	7/3/87							
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ITEM (See Key To #s)	17	18	19	20	21	22	23	24.
1. CHQ.	by CHQ.	5/9/86.	8/10/86	22/10/86	22/10/86			
2. Editor, Tech Digest.	25/9/86	25/9/86.	8/10/86.	22/10/86	22/10/86			
3. Editor, NW Tech.	25/9/86	25/9/86.	9/10/86.	22/10/86	22/10/86			
4. Ron Morgan.	25/9/86	25/9/86.	9/10/86.	22/10/86	22/10/86	25/10/86	13/12/86	13/12/86
5. Jim Davidson	25/9/86	25/9/86.						
6. John Gregory.	25/9/86	25/9/86	9/10/86.	22/10/86	22/10/86	25/10/86	8/11/86	8/12/86
7. Howard Rennick.	25/9/86	25/9/86.	9/10/86	22/10/86	22/10/86.		8/11/86	8/12/86.
8. Ed Grech.							8/11/86	8/12/86.
9. John Waring.								
10. Kay Callaway.								
11. Al Fryers.								
12. Bonnie Gebhardt.	25/9/86	25/9/86.	9/10/86.	22/10/86	22/10/86.			
13. Val Newcombe.	25/9/86	25/9/86.					8/11/86	8/12/86.
14. Helen Diemert								
15. John Taube.	25/9/86	25/9/86.	9/10/86.	22/10/86	22/10/86			
16. Pete Brewster.								
17. Bob Taylor	25/9/86	25/9/86					8/11/86	8/12/86.
18. Louie Kildaw								
19. Oscar Isaac								
20. Bryan Kickham								
21. R. Barrett (Windsor)								
22. Arvid Petersen	25/9/86	25/9/86.	9/10/86.	22/10/86	22/10/86			
23. Mrs. Carl Olson (M.J.)								
24. Greg Parker (G.P.)								
25. Dr. Ed Schaffer								
26. Dr. Gordon Fearn.								
27. Prof. Seymour Friedland								
28. Ross Deacon.	25/9/86	25/9/86					8/11/86	8/12/86
29. Peter Noel.								
30. John Wilson	25/9/86	25/9/86.					8/11/86	8/12/86

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ITEM (see Key to #s.)	17	18	19	20	21	22	23	24
31. Gust Mattson	25/9/86	25/9/86					8/11/86	8/12/86
32. John Miles	25/9/86	25/9/86		22/10/86	22/10/86		8/11/86	8/12/86.
33. Taras Rachuk.							8/11/86	8/12/86
34. Art Shaw							8/11/86	8/12/86.
35. Rick Woodward.							rtnd ~~8/11/86~~	
36. Robert Gregory	as for John Gregory						8/11/86	8/12/86.
37. Charles Spencer								
38. Alfhi Green	25/9/86	25/9/86.		22/10/86	22/10/86.			
39. Cyril Large.			9/10/86					
40. Gordon Drever.	9/10/86	9/10/86						
41. Lois Scheel	21/11/86	21/11/86						
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Master Distribution List

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Item (see Key to numbers).	1	2	3	4	5	6	7	8
1. CHQ	✓	✓	✓	✓	✓	✓	26/2/86	4/3/86
2. Editor, Tech Digest	✓	✓	✓	✓	✓	✓	26/2/86	4/3/86
3. Editor, NW Tech.	✓	✓	✓	✓	✓	✓	26/2/86	4/3/86
4. Ron Morgan.	✓	✓	✓	✓	✓	✓	26/2/86	
5. Jim Davidson	✓	✓	13/3/86		✓			
6. John Gregory	✓	✓	✓	✓	✓	✓	26/2/86	
7. Howard Rennick	✓	✓	✓	✓	✓	✓	26/2/86	
8. Ed Grech	✓	✓	13/3/86	✓		✓	26/2/86	
9. John Waring	✓	✓						
10. Kay Callaway	✓	✓						
11. Al Fryers.	✓	✓	✓	✓		✓		
12. Bonnie Gebhardt	✓	✓	✓	✓	✓	✓	26/2/86	4/3/86
13. Val Newcombe.	✓	✓	13/3/86	✓	✓	✓	26/2/86	
14. Helen Diemert	✓	✓						
15. John Taube	✓	✓	13/3/86		✓		26/2/86	4/3/86
16. Pete Brewster	✓	✓						
17. Bob Taylor	✓	✓	13/3/86					
18. Louie Kildaw	✓	✓						
19. Oscar Isaac	✓	✓	13/3/86					
20. Bryan Kickham	✓	✓						
21. R. Barrett (Windsor)	✓	✓						
22. Arvid Petersen	✓	✓	13/3/86					
23. Mrs. Carl Olson (M.J.)	✓	✓						
24. Greg Parker (G.P.)	✓	✓						
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26. Dr. Gordon Fearn		✓						
27. Prof. Seymour Friedland.		✓						
28. Ross Deacon	✓		13/3/86					
29. Peter Noel	✓							
30. John Wilson	✓		13/3/86					

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ITEM (see key to numbers)	1	2	3	4	5	6	7	8
31 GUST MATTSON	1/3/86.	1/3/86	13/3/86					
32 JOHN MILES	7/5/86	7/5/86	13/3/86		13/4/86			
33 TARAS RACHUK			13/3/86					
34 ART SHAW								
35 RICK WOODWARD								
36 ROBERT GREGORY.	as for John Gregory						✓	✓
37 CHARLES SPENCER								
38 ALFHI GREEN								
39 Cyril Large.								
40 Gordon Drever.	9/10/86.	9/10/86						
41. Lois Scheel	21/11/86	21/11/86	21/11/86		21/11/86			

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(ITEMS 9–16)

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ITEM (See Key To NUMBERS)	9	10	11	12	13	14	15	16
1. CHQ	12/3/86	2/4/86	29/3/86					
2. Editor, Tech Digest	12/3/86	7/4/86	7/4/86					
3. Editor, NW Tech.	12/3/86	7/4/86	7/4/86					
4. Ron Morgan	12/3/86	20/3/86	12/4/86					12/4/86.
5. Jim Davidson	13/3/86	25/3/86.						
6. John Gregory.	12/3/86	20/3/86	29/3/86					12/4/86
7. Howard Rennick	12/3/86	20/3/86	29/3/86					12/4/86.
8. Ed Grech.	13/3/86		12/4/86					12/4/86
9. John Waring			~~12/4/86~~					~~12/4/86~~
10. Kay Callaway								
11. Al Fryers	12/3/86	12/4/86	12/4/86					
12. Bonnie Gebhardt	12/3/86	2/4/86	2/4/86.					12/4/86
13. Val Newcombe	13/3/86	2/4/86	2/4/86					12/4/86
14. Helen Diemert								
15. John Taube.	13/3/86	2/4/86	2/4/86					
16. Pete Brewster								
17. Bob Taylor	13/3/86	23/5/86	12/4/86					12/4/86
18. Louie Kildaw								
19. Oscar Isaac	13/3/86.							
20. Bryan Kichham								
21. R. Barrett (Windsor)								
22. Arwid Petersen	13/3/86	7/4/86	7/4/86					
23. Mrs. Carl Olson (M.J.)								
24. Greg Parker (G.P.)								
25. Dr. Ed. Schaffer								
26. Dr. Gordon Fearn.								
27. Prof. Seymour Friedland								
28. Ross Deacon	13/3/86	25/9/86.						
29. Peter Noel			12/4/86.					12/4/86
30. John Wilson	13/3/86	25/9/86	12/4/86					12/4/86

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	9	10	11	12	13	14	15	16
31. Gust Mattson	13/3/86	25/4/86	12/4/86					12/4/86.
32. JOHN MILES	13/3/86	7/5/86	12/4/86					12/4/86
33. TARAS RACHUK.	13/3/86		12/4/86					12/4/86
34. ART SHAW.			12/4/86					12/4/86
35. RICK WOODWARD			12/4/86					12/4/86
36. ROBERT GREGORY	〃	〃	12/4/86	as for John Gregory				12/4/86.
37. CHARLES SPENCER.								
38. ALFHI GREEN.		25/4/86						
39. Cyril Large.								
40. Gordon Drever		9/10/86.						
41. Lois Scheel	21/11/86	21/4/86						